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September 19, 1994

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- where their strategies are taking them
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INFOWORLD

SEPTEMBER 19, 1994 | THE VOICE OF PERSONAL COMPUTING IN THE ENTERPRISE | VOLUME 16, ISSUE 38

ENTERPRISE COMPUTING

Putting every app function in its place

Partitioning lets you distribute client/server apps to maximize performance. **See page 99**

PRODUCT COMPARISON

Getting a grip on network management

Four integrated utilities let you monitor, inventory, and update your LAN. **See page 108**

INFOWORLD 100

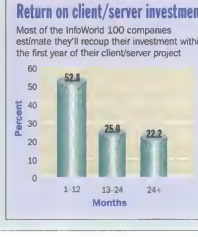
Survey proves it: Client/server delivers

BY STEWART ALSOP

What a concept: Client/server technology pays off! *InfoWorld* has invested in a major research project, which we will conduct annually, to identify the 100 most innovative and aggressive adopters of client/server technology in the United States. These organizations have pioneered the use of networked personal computers for mission-critical systems. Through them, we see that client/server technology works and pays for itself — rapidly. In fact, the most innovative systems pay for themselves within a year.

We know the problems associated with client/server: new development and management tools, retraining issues, and some highly visible failures by companies trying to move to the new platform. Yet, the reality is that commercial organizations must adopt this technology to remain healthy. This is true whether you are talking about maintaining the No. 1 spot in cellular phones, challenging the No. 1 provider of long-distance service with an innovative new billing application, or revamping the way that a state manages its database of drivers' licenses.

Peruse the InfoWorld 100, which starts on page 59 and includes a slew of statistics on the 100 most aggressive implementers and profiles of the top ten companies in the InfoWorld 100. We think you'll get a unique view of the client/server revolution and lots of information that will help you put your own situation into perspective.



Contura 400s replace aging Compaq line

BY BOB FRANCIS AND TERHO UIMONEN

Compaq Computer Corp. will officially announce at the end of the month new Contura notebooks that will replace its aging low-end notebook line.

Compaq unveiled the Contura 400 line at its technology summit in Singapore last week. The new line, already shipping in parts of Asia, is expected to ship in the United States in October, according to sources.

Pricing for the new Venturas will start at about $2,599. The notebooks will come with either dual-scan passive matrix color or active matrix thin-film transistor (TFT) color screens. The passive matrix models can be upgraded to active matrix color, Compaq officials said.

The systems are powered by Intel Corp.'s 40-MHz 486DX2 processors and are upgradable to 50-MHz 486DX2 chips.

The Plug-and-Play-compatible machines include 4MB of RAM, upgradable to 20MB; two PCMCIA slots; upgradable hard drives; and a status panel for battery life.

The base model weighs in at 5.9 pounds and includes a nickel-metal-hydride battery with 3.5 to 5.5 hours under typical

See CONTURA, page 152

Compaq rocks corporate world with AMD chip

AMD-based ProLineas are coming

BY BROOKE CROTHERS AND BOB FRANCIS

Intel Corp.'s long reign over the corporate PC market will come to an end next month when Compaq Computer Corp. begins delivering corporate PCs with "AMD Inside."

Processors from Advanced Micro Devices Inc. will debut in an update of Compaq's commercial ProLinea 4/66 MT. Compaq last week also released the AMD-based Presario consumer line.

ProLinea MT systems from here on out will come with either AMD or Intel 486 66-MHz DX2 processors. The brand of processor the system carries won't be obvious to users, said Jim Paschal, vice president of engineering at Compaq's desktop PC division.

"It's a powerful vote of confidence for AMD. There is no observable difference between AMD and Intel and no reason for users to care," said Michael Slater, publisher of the Sebastopol, Calif.-based *Microprocessor Report*.

The systems — which will not be formally announced — are already in the channel and should hit the shelves in the next three to four weeks, said John Sweney, a Compaq spokesman.

This development comes on the heels of a separate

See COMPAQ page 152

The ProLinea MT will begin to ship with AMD chips inside.

Picture this: a new look for videoconferencing

Point-to-point moves to multipoint

BY KAREN RODRIGUEZ AND BOB WALLACE

ATLANTA — Up to this point, videoconferencing has meant two talking heads engaged in digital meetings.

But starting this week, the first wave of low-cost products will take videoconferencing from point-to-point to multipoint — meaning a group of talking heads can be hooked together from multiple sites.

Sprint Corp. this week will begin selling multipoint video capabilities for Unix that use a variety of WAN connections, including private lines, frame relay, and Switched 56Kbps service. A Windows version will ship in January.

InVision Systems Corp. is offering the first desktop-based multipoint videoconferencing software, which will ship late this year. It will offer multi-

See SPRINT, page 152

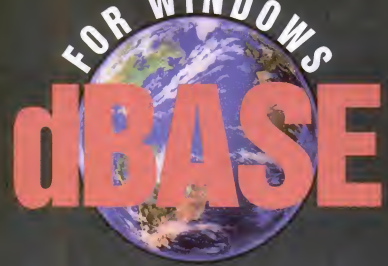
Novell provides a peek beyond NetWare 4.1

BY VANCE MCCARTHY

NetWare 4.1 still has a few months to go before delivery, but that isn't preventing Novell Inc. from outlining a host of more ambitious enterprise features for the next revision of the network operating system, slated to ship in late 1995.

On tap for the yet-unnamed NetWare upgrade are an extension to NetWare Directory Services that will allow for

See NETWARE, page 152



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AT DEADLINE

AMD gears up production of DX4-class processors

Advanced Micro Devices Inc. will begin producing a 33/100-MHz DX4-class processor in ample quantities this month, with volume shipments slated for the fourth quarter. The chip will come with 8KB of write-through cache vs. the 16KB of write-through on the Intel DX4. Pricing is not yet available, but sources said AMD's offering will fall below the $516 price for Intel Corp.'s 100-MHz DX4 chip. AMD is also planning a 33/100-MHz chip with a 16KB cache.

— Brooke Crothers

IBM delays PowerPC introductions

After months of rumors that IBM's forthcoming PowerPC PC systems would be seriously delayed, the company scrapped its October introduction plans last week. IBM said it will announce the systems in the first half of 1995. Sources said the line will be called the Power Series and will include the Power Series 400 desktop systems, the Power Series 600 ergonomic desktop systems, and the Power Series 800 ThinkPads. IBM still plans to ship Power Series systems this year to developers and select users.

— Cate T. Corcoran

Sun announces UltraSparc chips

Sun Microsystems Inc.'s Sparc Technology Business will announce the UltraSparc family of 64-bit chips this week. The UltraSparcs will have integer performance ranging from 200 to 400 SPECint92 and floating-point performance of 250 to 500 SPECfp92. The UltraSparc processor will also have built-in multimedia support, including support for two- and three-dimensional graphics, image processing, and MPEG-2 video compression and decompression at rates as high as 30 frames per second, the company said.

— Yvonne L. Lee

BRIEFLY NOTED: Day Networks Inc. will be the name of the company formed by the pending merger of SynOptics Communications Inc. and Wellfleet Communications Corp....Due to user demand for frame relay, **Sprint Corp.** will almost triple the number of network switches used to deliver the service by year's end...**Adobe Systems Inc.** has joined Component Integration Labs Inc., the OpenDoc consortium, and will develop Photoshop, Illustrator, and Premiere OpenDoc components...**Claris Corp.** will announce next month ClarisWorks 3.0 for Windows and Macintosh...**Intersolv Inc.** said last week it will acquire The Software Edge, a maker of problem-tracking software, for $5.7 million in Intersolv stock...**Hewlett-Packard Co.** will cut prices by 5 percent to 20 percent on its HP Vectra desktop PCs this week, company officials said...**Apple Computer Inc.** will bundle Adobe Acrobat Reader 2.0 software with PowerBooks and other systems starting on Dec. 1...**Compaq Computer Corp.** introduced three new consumer PCs, called the Presario 500 line, powered by chips from AMD...**Palm Computing Inc.** will show at Agenda 94 this week the $79 Graffiti handwriting recognition system, which is now available as an add-on for the Magic Cap operating system. It is also available for the Geos pen operating system and will ship for Newton later this year and for Windows for Pen Computing and WinPad next year...**Dell Computer Corp.** will announce a turnkey Internet host server package this week, combining Dell servers with software and installation from a variety of vendors, sources said...**Sun Microsystems Inc.** is shipping an Internet server and a management server. Netra Internet Server, starting at $6,149, offers Unix, PC, and Mac users a direct Internet connection from the desktop and includes Mosaic and security software. The Netra System Management Server starts at $10,399 and offers central administration for installing and administering PCs on TCP/IP networks...**Vivo Software Inc.**, a Waltham, Mass., start-up, is unveiling this week at Agenda its H320-compliant videoconferencing software, which requires no compression boards. Vivo320 will ship in the fourth quarter a complete system for $1,995, which includes an IBM ISDN card and video cards and a camera from Logitech Inc.

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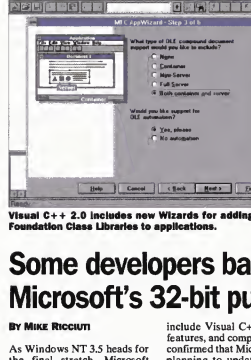
NEWS



Visual C++ 2.0 includes new Wizards for adding Microsoft Foundation Class Libraries to applications.

Some developers balk at Microsoft's 32-bit push

BY MIKE RICCIUTI

As Windows NT 3.5 heads for the final stretch, Microsoft Corp. is not-so-gently nudging developers toward a 32-bit world with a 32-bit update of its Visual C++ development tool, to be unveiled this week at Windows World in Dallas.

But some developers said last week they may not be ready to make the move.

When Visual C++ 2.0 ships 30 days after final delivery of NT 3.5, it will run on and develop applications for Windows NT 3.5 and the upcoming Windows 95 on Intel-based platforms, Microsoft officials said. (See First Look, page 148.)

Add-ons that will allow developers to develop applications for the Macintosh, as well as NT for MIPS-based and Digital Equipment Corp. Alpha-based platforms, are due to ship by the end of the year.

Visual C++ ships on a CD-ROM that includes both 16- and 32-bit versions. But the 16-bit version is an older release, Visual C++ 1.51, that doesn't include Visual C++ 2.0's new features, and company officials confirmed that Microsoft is not planning to update its 16-bit offerings.

Some developers consider this unabashed attempt to move the development community wholesale to Microsoft's 32-bit platforms an affront.

"I wish Microsoft would acknowledge that there are some users who can't yet target 32-bit operating systems," said Joe Schwartz, a consulting software engineer at Bankers Trust Co. in New York. Like the overwhelming majority of Windows developers, Schwartz develops applications for the 16-bit Windows 3.1.

Until Windows 95 ships sometime in the first half of next year, Windows NT 3.5 and the Macintosh will offer the only target platforms for Visual C++ 2.0 development.

"That's a problem if you have older code to support," said Jim Bohannon, a software engineer with Perkin-Elmer Corp.'s Applied Biosystems Division in Foster City, Calif.

Microsoft set to ship NT 3.5

Will bolster push into enterprise with SMS release

BY DOUG BARNEY

Microsoft Corp. is ready to launch what may be its boldest push yet into enterprisewide computing with the release of Windows NT 3.5 this month and is preparing a second line of attack with several related server software offerings.

NT 3.5, with both Workstation and Server versions for Intel, MIPS-based, and Digital Equipment Corp. Alpha-based platforms, should be widely available by the end of the month, Microsoft officials said. A PowerPC version will be delayed but is on its way.

Among its new features, the release of what was code-named Daytona will offer 32-bit to 16-bit OLE 2.0 interoperability, long file names, support for Silicon Graphics OpenGL three-dimensional libraries, faster IPX stacks, and new administration tools.

Many users are looking forward to NT 3.5, not necessarily because of its new features, but for the increased stability it offers.

"3.5 is the mother of all bug fixes. It is a worthy production product now," said Grant Smith, systems engineer at Cogito Economic Systems Inc., a data systems design firm in Hillside, N.J. Smith has already moved four production servers over to the beta software.

With NT Server 3.5 out of the way, Microsoft hopes to ship its Systems Management Server — code-named Hermes — SQL Server 4.21A, and SNA Server 2.1 before the end of the year, according to Mike Nash, group manager for NT Server.

The final weapon in Microsoft's arsenal, the Exchange messaging and groupware system, is scheduled to enter its final round of beta testing in January, although no final release date has been set.

"The real significance is that now people can not only understand intellectually that NT is part of a family, but they can actually stitch them together," said Robert Guaraldi, president of Valinor Inc., a systems integration company in Manchester, N.H.

Now that Microsoft is pitching this integrated software family, the company's marketing heads have decreed that a more consistent pricing model is also required, sources inside the company said.

With NT 3.5, Microsoft will launch a new per-node graduated pricing scheme that will apply to all future and existing Microsoft server products, according to a source within Microsoft.

Customers will be charged $699 per copy of NT Server, plus $39.95 for each NT node running on the network.

"We want to make it more affordable, so you will pay for what you get as you add users," said another source close to the NT team.

The previous version of NT Advanced Server cost $1,495 for an unlimited number of users.

Microsoft is also devising a plan that will allow third-party software developers to bundle NT 3.5 and other Microsoft server products with their applications, said Dwayne Walker, Microsoft general manager of worldwide sales and marketing.

Microsoft is not yet in active negotiations with software vendors, according to Nash.

But the plan has been put on the table with the goal of garnering third-party endorsements of NT and expanding the numbers of sales representatives spreading the word about Version 3.5.

Some ISVs said last week that the bundling scheme may also help them get their own software to customers.

"It could be a good way to let someone experience our product, even if they don't [already] have NT," said Kirk Cruikshank, vice president of marketing for Arbor Software Corp. in Sunnyvale, Calif., makers of the Essbase OLAP database server.

Windows NT 3.5 not alone: pair of suites to back up OS

BY ILAN GREENBERG

Microsoft Corp. isn't going to let Windows NT 3.5 hit the streets alone.

By year's end, Microsoft will also deliver a server suite, called BackOffice, that will bundle Windows NT Server with the Systems Management Server, SQL Server, SNA Server, Windows NT Server, and Mail Server, said Rolf Skoglund, vice president of Microsoft's organization business unit in Europe, at a European analyst briefing last week.

Compaq Computer Corp. has already indicated it will start selling ProLiant servers optimized for BackOffice in the fourth quarter, said Gary Stimac, senior vice president and general manager of Compaq's systems division.

BackOffice will cost $2,199 per server plus $309 for each PC connected to the server.

Microsoft plans to support the new Workstation version of the OS with the release of Office for NT within 30 days of Daytona's debut.

The Office for NT Workstation applications will retain the core code and appear identical to the Windows Office applications. But the NT versions will be faster and have better resource management, said Joan Morse, Excel group product manager.

The NT version of Word 6.0 will also offer multithreaded printing, which allows users to work on a document while the file is fed to the printer.

Both Word 6.0 and Excel 5.0 for NT will be 32-bit. The third Office application, PowerPoint 3.0, will be offered initially in a 16-bit version.

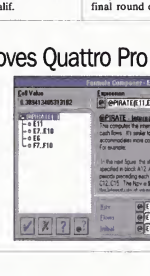
Office for NT will be priced at $499. Any single Office for NT application is priced at $399; an upgrade for Windows 3.1 users is $129.

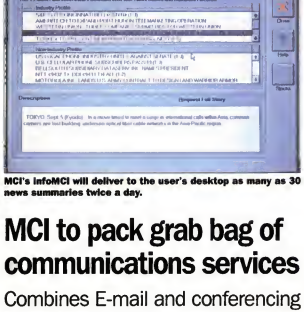
—Cara A. Cunningham and Torsten Busse, European correspondents for IDG News Service, contributed to this report.

Product Spotlight

Novell/WordPerfect improves Quattro Pro with 6.0

Novell/WordPerfect's Quattro Pro 6.0 for Windows offers substantial improvements over the previous version. Highlights include redesigned menus and toolbars, one-step hot-linking to external databases, and in-cell editing. The new Formula Composer exceeds Microsoft Corp. Excel's Function Wizard in some ways. After you choose a function, Quattro Pro displays a tree diagram of the function that expands as you add arguments. While working, you view a detailed description, often with an example. The product is rumored to be announced next week; details on pricing were not available. For complete coverage of the new product, see the First Look on page 147.





MCI's infoMCI will deliver to the user's desktop as many as 30 news summaries twice a day.

MCI to pack grab bag of communications services

Combines E-mail and conferencing

BY DOUG VAN KIRK AND BOB WALLACE

ATLANTA — MCI Mail will get a face-lift and a host of associated information services next month when the carrier launches networkMCI Business, a suite of information service products delivered via MCI Corp.'s long-distance network.

Users will be able to access their MCI Mail, LAN-based E-mail, and multiple other information services from a Windows-based interface, officials at the NetWorld+Interop conference said here last week.

networkMCI Business will include point-to-point desktop conferencing, fax forwarding service, Internet access, a news clipping service and a multimedia business-to-business catalog ordering. The suite is not intended to replace standard MCI Mail.

networkMCI Business will ship next month for $100 plus $65 per month ($50 for MCI long-distance customers) with an additional charge for each message sent beyond a monthly minimum.

Customers can also lease videoconferencing equipment for $110 per month.

"MCI is delivering tremendous power to the desktop at a rock-bottom price," said Christine Heckart, an analyst with TeleChoice Inc., a Verona, N.J., consultancy. "It's well on its way to becoming a complete business solution."

Users are likely to find the new MCI Mail interface — and infoMCI, a news clipping service — among the most attractive features of networkMCI Business. e-mailMCI provides a unified inbox that can display messages from MCI Mail and LAN-based E-mail programs such as Lotus Development Corp.'s ccMail.

MCI will also provide an information retrieval service. The infoMCI information service can deliver 30 summaries of news items twice daily, garnered from 180 electronic information services and databases. Users can order as many as 15 full-text items per day at no additional charge.

conferenceMCI enables users to engage in point-to-point desktop voice and data conferencing using regular 9.6Kbps dial-up lines. The cost of networkMCI Business includes whiteboard software from DataBeam Corp. Users need 40MB of hard disk space and 8MB of RAM to use conferenceMCI.

infoMCI can deliver news from 180 sources.

For those users interested in electronic commerce, MCI offers marketplaceMCI. With this offering, the carrier works with users to develop applications that run from servers on MCI's long-distance network.

marketplaceMCI and MCI Mail users can dial in to the servers, review high-resolution color images of products, read accompanying data such as pricing, and order items on-line.

MCI will charge users a fee, which will vary from company to company, to deliver the information on marketplaceMCI. Officials would not discuss pricing.

Sybase finally ships parallel add-on

BY MIKE RICCIUTI

After talking about it for more than a year, Sybase Inc. officials said last week that the company is finally shipping its Navigation Server parallel processing add-on for the SQL Server database next month.

Sybase has been criticized for Navigation Server's tardiness, but several analysts said last week the delay probably won't hurt Sybase in the long run because the market for parallel database servers is still small.

"Customers are just now gearing up to use these systems," said Norton Greenfeld, an analyst with Computer Intelligence InfoCorp in Westborough, Mass.

Database parallel processing is designed to greatly speed up response time and enable users to handle extremely large decision support databases and "data warehouses" on local servers instead of mainframes.

Navigation Server is a parallel processing add-on for the SQL Server relational database. It runs on massively parallel processing, symmetric multiprocessing, and clustered server systems to divide the workload among multiple database engines distributed across multiple processors.

Navigation Server includes a configuration tool that helps the user set up the server hardware and decide how many copies of the SQL Server engine are needed.

Prices for Navigation Server start at $150,000, each SQL Server engine is sold separately.

Although Sybase pioneered the concept of parallel database processing, Navigation Server's delayed shipment has given competitors time to catch up.

Oracle Corp. already sells a parallel-enabled server called Oracle Parallel Server, and Informix Software Inc. said last week that it will ship a parallel version of its database server, OnLine Dynamic Server, Version 8.0, by mid-1995. IBM is also planning a parallel version of DB2 for delivery next year.

Sybase will deliver Navigation Server to several handpicked sites in October and will follow up with a general release in December for AT&T 3600 series parallel servers. By mid-1995, Navigation Server will support additional AT&T servers, as well as IBM's PowerParallel System SP2, Hewlett-Packard Co.'s HP 9000 series, and Sun Microsystems Inc.'s Sparcserver 1000 and SparcCenter 2000 servers, according to the company.

Sybase attributed Navigation Server delays to the unanticipated complexity of building such a large database system.

That same complexity may slow Navigation Server's adoption. Katrina Garnett, Sybase vice president of parallel and distributed products, estimated only 20 percent to 30 percent of users will opt for Navigation Server.

Forte eases app development burden

Automated application partitioning ups performance

BY MIKE RICCIUTI AND SCOTT MACE

An application development tool to be delivered this week by upstart Forte Software Inc. may usher in a new wave of tools that will radically reduce the drudgery of client/server development, analysts said.

Forte's tool, the Forte Application Development Environment, automatically splits up complex applications between the client and the server. This technique, called application partitioning, is the cornerstone of the Oakland, Calif.-based company's product strategy.

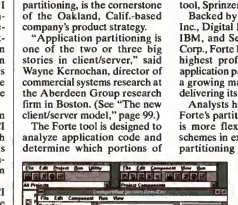
"Application partitioning is one of the two or three big stories in client/server," said Wayne Kernochan, director of commercial systems research at the Aberdeen Group research firm in Boston. (See "The new client/server model," page 99.)

The Forte tool is designed to analyze application code and determine which portions of the application should be processed on desktop clients and which parts on server-based databases. The goal is to minimize network traffic between application segments and thereby increase application performance, said Forte president and CEO Marty Sprinzen.

Forte determines a default partitioning scheme for optimum application performance, but developers can override the defaults and re-partition applications easily using a drag-and-drop graphical partitioning tool, Sprinzen said.

Backed by Apple Computer Inc., Digital Equipment Corp., IBM, and Sequent Computer Corp., Forte has made itself the highest profile proponent of application partitioning tools in a growing market even before delivering its first product.

Analysts have noted that Forte's partitioning technology is more flexible than similar schemes in existing application partitioning tools, such as Ellipse from Bachman Information Systems Inc., in Burlington, Mass., and Dynasty from Dynasty Technology Inc., in Naperville, Ill.



Forte lets developers partition applications via a drag-and-drop interface.

Users said last week that Forte's automated partitioning removes a step that has typically bogged down application development.

"Building client/server applications is so complex it's hard to estimate resources using typical development tools," said Forte beta tester Allan MacDougall, director of IS at Saddleback Community College District in Mission Viejo, Calif.

Others praised the performance of the resulting applications.

"Partitioning lets us develop a piece of software and place it where it works most efficiently," said Don Christensen, a Forte beta tester and IS manager at Medtronic Inc., a medical systems manufacturer in Minneapolis.

Forte supports development of C and C++ applications for Windows 3.x, Motif, and Macintosh and will run on servers from Data General Corp., Digital, Hewlett-Packard Co., IBM, Sequent, and Sun Microsystems Inc. It builds applications for Oracle Corp.'s Oracle7 and Rdb and Sybase Inc.'s SQL Server databases and works across TCP/IP and DECnet network protocols.

A full Forte development kit is priced at $75,000; it supports five developers, 25 users, one client platform, one database interface, and one server platform.

Depending on the number of licenses purchased, additional developer licenses cost between $4,000 and $6,000, and additional user licenses cost between $200 and $750.

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Cisco takes aim at remote office communications

LAN Extenders, Access Server models shown

BY BOB WALLACE

ATLANTA — As expected, Cisco Systems Inc. used the NetWorld+Interop conference here last week as a backdrop to launch a barrage of products that will enable network managers to tie remote sites to enterprise internetworks.

Although Cisco unveiled a remote office router line earlier this year, the new products are designed for even smaller sites, mobile workers, and telecommuters.

"This is an all-out assault on the remote office market that addresses the communications needs all the way down to a mobile employee," said Nick Lippis, a principal with Strategic Networks Consulting Inc., in Rockland, Mass.

"Users have been looking for these products for some time and will find them to be priced attractively," Lippis added.

Cisco announced LAN Extenders, which let users link sites with one Ethernet LAN and one WAN port to sites with low-end, midrange, and high-end Cisco routers. LAN Extenders support LAN protocols, including Novell Inc.'s IPX, and will ship next month for $1,595.

For users who don't need full-time links to central office sites, Cisco will ship next month the Access Servers, which enable network managers to provide up to eight or 16 ports of 28.8Kbps asynchronous dial-up access to LANs.

The Model 2509 (one Ethernet, eight asynchronous ports) will cost $2,995 to $4,495; the Model 2510 (one Token Ring, eight asynchronous ports) will cost $3,495 to $4,995; the Model 2511 (one Ethernet, 16 asynchronous ports) will cost $3,995 to $5,495; and the Model 2512 (one Token Ring, 16 asynchronous ports) will cost $4,495 to $5,995.

Cisco also unveiled the AccessPro PC Card, a remote access router that can be plugged into ISA or EISA bus-based PCs.

The card can support one Ethernet or one Token Ring and two WAN links. The Ethernet version is shipping now and costs $1,995 to $3,495; the Token Ring version will ship next month and cost $2,495 to $3,995.

Cisco also unveiled two integrated hub-router products that combine in a single device both routing and wiring concentration.

The Model 2505 will support eight Ethernet ports and will be priced from $3,095 to $4,595; the Model 2507, which supports 16 Ethernet ports, will cost $3,595 to $5,095.

Both models will ship in November.

Cisco is currently working on hub-router products that will support eight or 16 Token Ring ports.

IBM's revamped desktop PCs

IBM PC Series 300

- SelectaBus: PCI and VESA
- Processor: 33-MHz 486DX, 66-MHz DX2, 100-MHz DX4, 60-MHz Pentium
- RAM: 4MB to 128MB
- Graphics: 32-bit
- Auto-start capability: yes
- Approximate pricing: $1,000 to $2,500

IBM PC Series 700

- SelectaBus: PCI and ISA now, PCI and MCA next year
- Processor: 33-MHz 486DX, 66-MHz DX2, 100-MHz DX4, 90-MHz Pentium
- RAM: 4MB to 32MB
- Graphics: 64-bit
- Auto-start capability: yes
- Approximate pricing: $1,200 to $4,000

Apple tiptoes toward OS licensing plan

Mac OS logo will identify brand on other hardware

BY ILAN GREENBERG

Without naming names or specifying a time frame, Apple Computer Inc. outlined last week its strategy to license its System 7.5 operating system to as many as six hardware manufacturers.

Apple also unveiled a new logo for the Mac OS with the intent of building up brand equity, just as Microsoft Corp. did with the ubiquitous multicolored Windows flag.

Apple refused to identify the companies with which it is finalizing deals, but previous reporting has linked Apple's name with IBM and Motorola in the United States, Acer Group in Taiwan, Toshiba Corp. and Fujitsu Ltd. in Japan, Vobis Microcomputer AG in Germany, Olivetti & Co. in Italy, and others in overseas and vertical markets.

Officials did characterize Apple's partners as "middle-sized, with strong identities in vertical markets," said Don Strickland, vice president in charge of licensing.

Strickland added that Apple is targeting vendors that are strong in markets where Apple traditionally has not been successful, such as the international education market.

Some analysts have criticized Apple for what they deem an overly cautious approach to third-party licensing.

"If you're going to license, you've got to license with people who are going to compete against you," said Kimball Brown, an analyst with the San Jose, Calif., market research company Dataquest. "That's the only way to create a clone market. If Apple doesn't build up market share for the Power Mac, IBM will abandon the platform, in three or four years Intel will catch up, and Apple will be dead," he added.

IBM readies corporate lines to replace PS/2, ValuePoint

BY CATE T. CORCORAN

IBM is set to deliver new portables and a desktop line, the PC Series 300 and 700, that will offer corporate users a variety of innovative features, including a remote diagnostic service and desktops that can be started up and accessed remotely, sources said.

The IBM PC line, a pared-down series based on industry-standard technology, offers users a choice of bus technologies (see chart). It will replace IBM's PS/2 and ValuePoint personal computers in early October, sources said.

The IBM PC Series 300 is aimed at small and midsize companies. The IBM PC Series 700 is geared toward large corporate accounts.

The 330 and 730 systems come with three slots and three bays; the 350 and 750 desktops feature five slots and five bays.

Both groups of systems can be ordered with hard drives of 270MB, 340MB, 540MB, or 720MB, sources said.

In addition, the PC line will have a power supply that can turn on the system in response to a telephone ring. Voice and fax/modems will be optional.

Other options include PCMCIA slots, business audio, double-speed CD-ROM, voice control capabilities, and an MPEG video playback card.

IBM will provide a remote diagnostic service for systems with modems, similar to the Online Housecall it offers home users. Users with modems and the remote diagnostic software on their desktops and portables will also be able to access and download files remotely from their systems to their portables.

IBM will also ship improved ThinkPad portables next month, including 810MB hard drives on the 700 series and the 25/50-MHz 486DX2 chip on all models. The ThinkPad 750 series will also gain the 33/100-MHz DX4. Pentium chips will not be available in portables this year. The 500 series subnotebooks will have innovative keyboards that pull out and unfold to full size, extended beyond the system's edges slightly, sources said.

HP ships Vectra system with DMTF technology

BY VANCE MCCARTHY

The push to deliver smarter, more manageable systems to the desktop got a boost last week when Hewlett-Packard Co. introduced the first system that will ship with technology developed by the multivendor Desktop Management Task Force.

DMTF, led by Microsoft Corp., Novell Inc., and Intel Corp., among others, has completed work on the PC systems and LAN adapter portions of the technology, which will ease the configuration, setup, and troubleshooting of desktop systems.

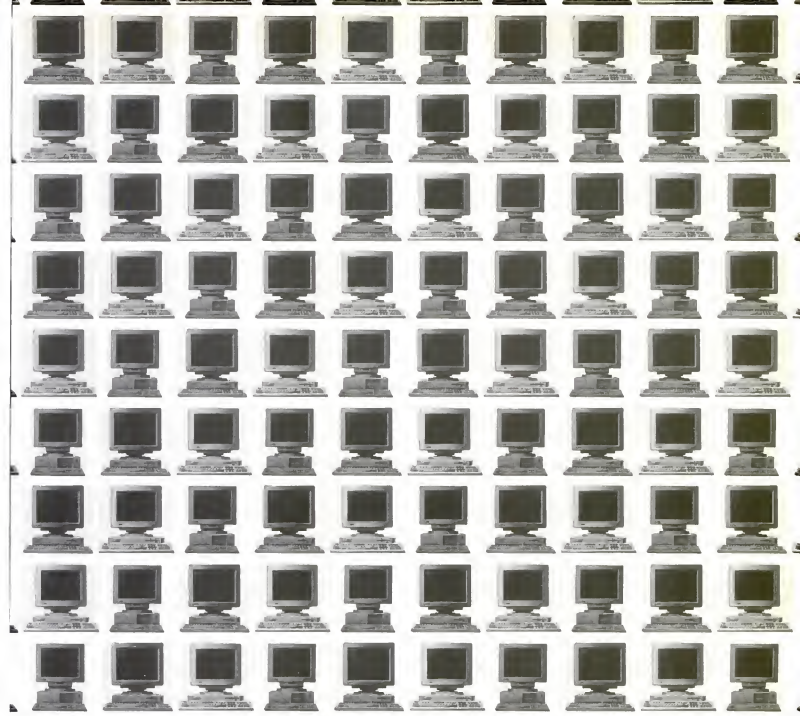
Specifically, the DMTF specified a management information file, which tracks statistics on the operation of CPU, hard drive, memory, operating system, and add-in cards. This data, when delivered through a management platform, will for the first time reveal to administrators the internal operations of these components.

Although the HP Vectra may be the first on the market to sport the DMTF technology, many major PC firms, including IBM, Compaq Computer Corp., and Dell Computer Corp., are expected to debut such systems by fall Comdex.

Apple Computer Inc. joined DMTF after more than a year of sitting on the sidelines. The DMTF initiative was criticized by some Apple managers because it was limited to PCs and Unix desktops.

"Along with our support for SNMP, we are confident that with DMTF we can provide a full range of manageable systems," said Gary Hornbuckle, Apple's product line manager for communications products. Hornbuckle declined to specify when DMTF-complaint systems would ship, but said the technology would be integrated into an upcoming version of its operating system, making the DMTF technology also available to vendors that license the Apple OS.

The HP Vectra uses DMTF technology that eases configuration and setup.



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Customers cautiously optimistic about Novell strategy

BY MARTIN LAMONICA

ATLANTA — Novell Inc.'s presentation of its corporate refocusing at last week's NetWorld+Interop reassured end-users and NetWare developers but — after the fanfare — left many wanting more details.

Novell grabbed center stage at the show as President Robert Frankenberg sketched the software giant's strategy after several recent major corporate changes, notably the establishment of friendlier relations with Microsoft Corp. and the acquisition of WordPerfect Corp. Frankenberg also confirmed that Novell would restructure its operations into four divisions. (See "Novell to detail 'back to basics' plan at NetWorld," Sept. 12, page 1.)

"Clearly, Novell has not done a good job in the past articulating who they were and what they were doing," said John Bjelland, vice president of information technology and application architecture management at Cargill Inc., in Minneapolis. Frankenberg showed that "there is a real clear focus on networking," Bjelland added.

Novell's plan for a combined server operating system, code-named SuperNOS and slated for a 1996 release, would simplify Cargill's operations and provide a compelling reason for Cargill to stay with NetWare on its 1,000 Intelbased servers worldwide, Bjelland said.

Novell will address wide-area connectivity in the future through new client software, including wireless extensions to its NetWare Connect client, and a combined service with AT&T.

Novell plans to introduce threedimensional graphical client software, code-named Ferret, that will allow Windows and UnixWare clients to browse corporate and public networks and to perform on-line transactions.

Frankenberg also said that while Novell doesn't want to be in the vertical applications business, it plans to introduce AT&T Connect Services to provide LAN-to-LAN wide-area connectivity as well as network management, billing, and backup services. The service will go into beta testing before the end of the year and will be rolled out internationally in the second half of 1995.

And although Novell's presentation emphasized the importance of NetWare, one NetWare developer was concerned less with Novell's vision of networking at the end of the decade than with users' immediate needs to migrate from NetWare 3.x to NetWare 4.x.

"We think more people are going to lodge the bill of fix and go with Windows NT," said Kenneth Morneault, software development manager at Symmetrical Technologies, in Herndon, Va., which develops backup software for NetWare LANs. Morneault, who complained of poor Novell documentation for file-sharing protocols, said his company plans to introduce native Windows NT versions of its products.

—Martin LaMonica is a U.S. correspondent for IDG News Service.

For the record

In the Sept. 12 product comparison of TCP/IP software (page 66), we incorrectly stated that The Wollongong Group Inc. had not yet fixed a NetWare 3.12 incompatibility problem with its PathWay Client NFS for DOS/Windows product. Because we did receive a fix before publication, we raise the score for Ease of use/overall for Wollongong from Satisfactory to Very Good and the score for Performance from Satisfactory to Good. As e result, the final score is now 5.5. The score for Ease of use/overall for IBM's TCP/IP Version 2.0 for OS/2 Base Kit, NFS Kit, and DOS/Windows Access Kit products also was incorrect. It should have been Good. This score change does not change the final score, however.

The Sept. 5 Briefly Noted section (page 3) incorrectly reported that Gupta Corp. is discontinuing its direct sales force. Gupta has initiated a transition to a sales structure composed of 75 percent indirect sales and 25 percent direct sales. The company did not specify when this transition will be complete.

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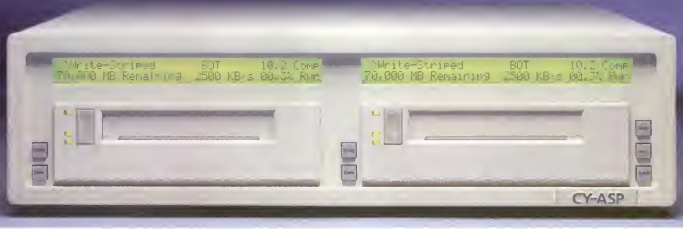

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DEC HSC	PrOX
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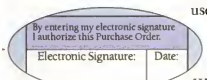

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RAM Mobile prepares more base stations, smaller modems

BY DOUG VAN KIRK

ATLANTA — Customers of RAM Mobile Data will see within 12 months better coverage within buildings and smaller modems with longer battery life, company officials said last week at NetWorld+Interop.

Responding to customer concerns about poor reception and lost connections inside buildings, RAM will add more base stations in both existing and new areas in the coming month. The base stations form a link between RAM customers and their Mobitex-standard modems and land-line communications.

Although not admitting widespread coverage problems, the company said it would add in the next two years far more base stations than the 500 originally budgeted, said Peter Mannetti, vice president of marketing for the Vienna, Va.-based company. The additional base stations will be located in sites where customer usage is heavy or reception is difficult, and some stations could even be placed on corporate and institutional campuses, Mannetti said.

"We're glad to see it," said the marketing director of one wireless software vendor tightly tied to RAM. "We've seen customers delay implementations or switch to Ardis [a competing network from Motorola] due to in-building coverage concerns."

The increase in planned base stations is the result of a recent introduction of a low-priced base station by Ericsson, RAM's Sweden-based supplier.

According to Mannetti, the new units are not only much smaller — allowing greater flexibility for installation — but sell for approximately one-third of the price of RAM's existing base stations.

RAM is also working with modem manufacturers to develop PCMCIA Type II and III modems with longer battery life and to take advantage of new base station operating software, which can set modems to a sleep mode when no data is being transmitted.

There will be a variety of modem form-factors, including PCMCIA Type II and III, as well as a smaller Mobidem modem with fax and land-line capabilities, Mannetti said, declining to name manufacturers.

Solomon expands accounting line to Windows NT Server

BY ILAN GREENBERG

Solomon Software Inc. is putting Windows at both ends of the client/server equation, expanding its Windows repertoire with a version of its Solomon IV accounting line for Windows NT Server and Microsoft Corp.'s SQL Server 95.

First released in February for NetWare with Windows clients, Solomon IV for Windows is a 10-module accounting package that accesses data in Btrieve Technologies Inc.'s Scalable SQL.

Solomon IV for Windows will be available at the end of October in a single-user version running on Btrieve's client edition of Scalable SQL. Prices will range from $495 to $795 per module.

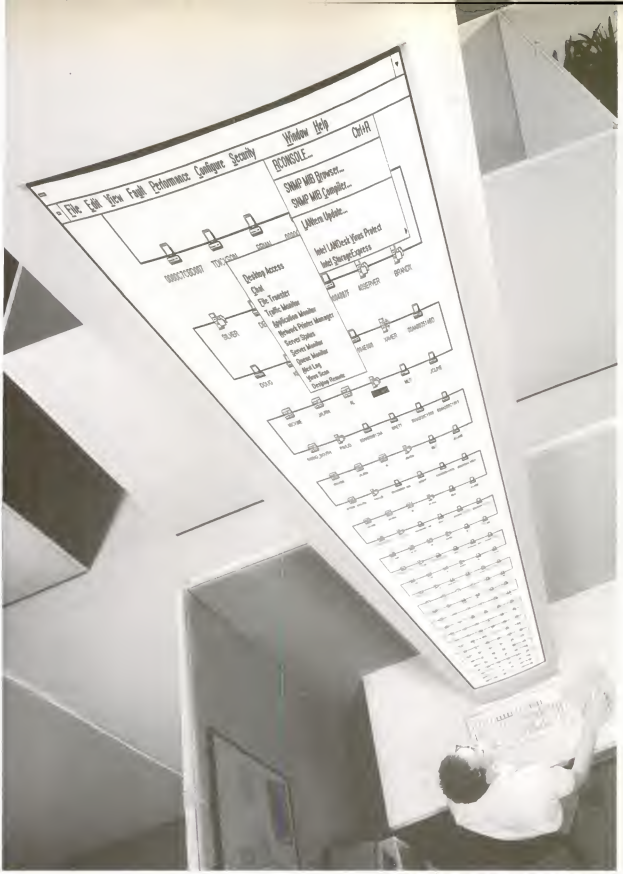
At the server end, the Windows NT Server version with the Btrieve database engine is scheduled to ship in the first quarter of next year. The system is priced at $1,295 to $10,995 per module, depending on the number of users.

In the first quarter of 1995, Solomon plans to also release a Windows NT version that will link to data in Microsoft's SQL Server 95 database as an alternative to the Btrieve version. The SQL Server version will be priced between $5,000 and $20,000 per module.

Six additional modules for the Solomon IV lineup are currently in beta: Purchasing, Payroll, Bill of Materials, Currency Manager (for currency conversion), Cash Manager, and Fixed Assets. The new modules will be included in all upcoming Solomon releases.

Some analysts interpreted Solomon's move to NT as indicative of underlying market changes.

"Companies like Solomon need to broaden the platforms they support to compete successfully," said Clare Fillan, an analyst with San Jose, Calif.-based Dataquest.



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PIPELINE

SHIPPING

Ashlar releases first Pen-based CAD apps

Ashlar Inc. shipped last week Vellum for Windows Pen, the first CAD application for the Pen interface. Vellum 3D for Windows Pen is $2,995, and Vellum 2D for Windows Pen is $2,495. Both applications, aimed at mechanical engineers and designers, feature a Drafting Assistant and parametrics. (800) 877-2745.

MITI last week shipped its SQR Workbench report writer package for Ingres databases. The tool, already shipping for databases from Oracle Corp., Sybase Inc., and Informix Inc., combines SQR, a fourth-generation language; Easy SQR, a point-and-click Windows-based report writer; and SQR Toolkit, a set of developer tools for debugging and documenting reports. Prices for the Ingres version start at $1,200. (310) 424-4399.

Solomon Software has released four Competitive Data Conversion (CDC) applications that allow the quick conversion of master file and balance data from DOS-based accounting packages to Solomon IV for Windows. Solomon is offering CDC modules for: Great Plains 7.0a, Macola 6.0, Platinum 3.0 and 4.0, and M*A*S90 Evolution/2. A single CDC module costs $495; all four cost $995. Also, Solomon has added a user forum on CompuServe. (800) 879-0444.

ACI US Inc. has shipped its 4D Passport, a development tool that links applications for its 4th Dimension for Macintosh database to SQL-based relational databases. 4D Passport is priced at $6,000. A multideveloper version, 4D Multi Passport, costs $15,000. (408) 252-4444.

PRICE CUTS

Competitive upgrade offered for Ecco 2.0

Arabesque Software Inc. has announced that it will offer users of competing personal information managers a $77 upgrade to Ecco Professional 2.0 through November. (800) 457-4243, ext. 10.

Patton & Patton Software Corp., citing market saturation for flowcharting tools, cut the price of its Flow Charting 4 for Windows software from $315 to $199. Flow Charting 3 for DOS dropped from $250 to $149. (800) 778-6557.

News Analysis

IBM hoping to gain on Windows with OS/2 3.0

BY DOUG BARNEY

Although IBM is hoping its upcoming version of OS/2 will help break Microsoft Corp.'s operating system stranglehold, a lack of ISV and OEM support is making analysts skeptical.

IBM may have as much as nine months to market OS/2 3.0, due to ship next month, before Microsoft Corp. ships its 32-bit Windows 95 (Chicago) in the first half of next year. Until then, IBM can legitimately claim to be delivering the premier 32-bit operating system for PCs.

And make no mistake, the company plans to make the most of this window of opportunity while it lasts, IBM officials say.

Although OS/2 3.0 — known by its code name Warp — has been enthusiastically greeted by beta testers, many analysts don't think it will make any real changes in the OS competitive landscape.

"There will probably be a positive impact, but it is such a rounding error when compared to the installed base of Windows," said Terence Quinn, managing director of Furman Selz Inc., a New York-based brokerage company that tracks PC software.

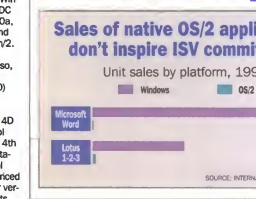
With OS/2 3.0, IBM is going after market segments where OS/2 has floundered, specifically small-to-medium businesses and the home.

The company will release, at the same time, a base configuration of Warp aimed at mobile and home users and a LAN client version for corporate customers; both versions will be available in a "full-pack" configuration that includes Windows 3.1 source code.

IBM believes that OS/2 3.0 can make inroads against Windows for a number of reasons: delays in the shipment of Windows 95; a Justice Department ruling that makes it easier for PC makers to offer non-Windows OSes; and OS/2's new feature set, which includes a new interface, a bundled set of productivity applications, and software that facilitates connectivity to the Internet.

But observers note that the growth of the OS/2 market is

See IBM, page 22



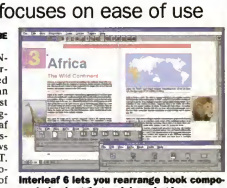
Interleaf 6 finally goes to Windows

Version focuses on ease of use

BY WILLEM KNIBBE

SAN FRANCISCO — Interleaf Inc. unveiled at Seybold San Francisco last week its long-awaited Interleaf 6 publishing system for Windows and Windows NT.

Interleaf focused on ease of use and integration with existing Windows environments in porting its popular publishing environment to Windows. The $995 software, to ship by year's end, will help workgroups manage and assemble business data.



Interleaf 6 lets you rearrange book components by dragging and dropping icons.

"The version for Windows appears to have been done correctly — it's really industrial-strength document creation and management," said analyst Joel Wecksell, vice president at the Gartner Group, in Stamford, Conn.

Beta testers said Interleaf 6's move to Windows will make it easy to learn for new or occasional users. Longtime Interleaf users may need time to adjust to interface changes.

Other beta testers said the Windows version incorporates Interleaf's traditional strong points.

"[Interleaf's] strength for us is being able to gracefully mix text, graphics, and charts, and put it together with a minimum of overhead," said Mark Read, systems administrator at CS First Boston Inc., in New York. "It continues to have very strong filtering capabilities."

Users can also access files and data via DBLink, (which embeds SQL queries in documents to link to SQL and ODBC-compliant databases), OLE 2.0, or the Active Link Tool.

Other users praised Interleaf's capability to take any files and automatically turn them into formatted documents.

"It extracts the information from anywhere on the network, formats it, and checks it for validity," said Hal Miller, software developer for Tasc, in Reading, Mass.

Document review is aided by Interleaf 6's Publish feature, which lets users output a document to Interleaf's WorldView or other portable document formats — such as Adobe Systems Inc.'s Acrobat — to send to the workgroup for annotation.

The company will also ship by year's end a $1,495 Developer's Edition that includes tools to extend Interleaf 6 via Visual Basic, C++, or LISP, as well as a utility for creating custom data import/export filters.

Interleaf, in Waltham, Mass., is at (800) 955-5323.

Users fear hassles in using component software

BY ELINOR MILLS

As Microsoft Corp. promoted OLE and OpenDoc's codevelopers prepared users for OpenDoc's upcoming release, several users at Windows Solutions earlier this month worried that a brave new world of component software will be a chaotic one for them.

Several users attending an informal panel discussion lead by Bill Kesselring, manager of OpenDoc technology at WordPerfect, the Novell Applications Group, and Jeff Alger, senior product manager of OLE Marketing at Microsoft, voiced similar concerns that version control and technical support issues have not been sufficiently worked out to make the vision of component software a reality.

"There are going to be some problems getting objects from different vendors to interface together, particularly with different versions," said Alan Merriam, information systems engineer for Lockheed Missiles & Space Co., in Sunnyvale, Calif. "Instead of reacting to one dominant [application] you're going to be reacting to all the different components within the [application.] Or they're going to have to be backward compatible forever."

Proponents of OLE and OpenDoc propose to replace today's model of large, feature-rich applications developed by individual vendors with component software — compact, task-specific chunks of code that can be fitted together by users to form customized applications, without having to pay for features they never use.

Microsoft has been recruiting third-party support for OLE 2.0 since 1993, and OLE for Macintosh just shipped this summer. A total of 43 vendors demonstrated OLE components, called OLE controls, at Windows Solutions, demonstrating that the OLE component concept is picking up steam.

OpenDoc — a component software architecture being co-developed by Apple Computer Inc., IBM, WordPerfect, and Component Integration Laboratories Inc. — will be available in a beta version in late fall. The developers predict that OpenDoc components will start materializing in the first quarter of next year.

See COMPONENT, page 26

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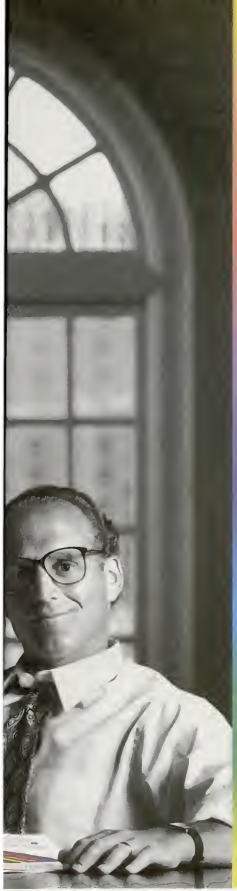

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ZyImage 3.0 will facilitate distribution on CD-ROMs

Boasts integration with WordScan OCR software

BY WILLEM KNIBBE

ZyLab is shipping this week an upgrade to its ZyImage image and text retrieval software that will help users distribute their document databases on CD-ROM.

ZyImage 3.0 also features batch processing improvements and tight integration with the latest version of Calera Recognition Systems Inc.'s WordScan optical character recognition (OCR) software.

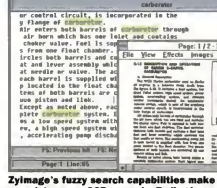
ZyImage 3.0 costs $995. But the application is integrated with WordScan and cannot be run independently. WordScan must be purchased separately for $595.

"Our integration is not based on toolkits or OLE 2.0, so we can offer all of WordScan's features," said ZyLab president Jon Karlin, referring to features such as page zoning, auto-page orientation, and batch processing.

ZyLab has also integrated APIs to Meridian Data Inc.'s CD-ROM recorders so that users can easily plug in the $8,295 NetScribe or Personal Scribe recorders, which sell for $4,195 to $6,195.

ZyImage's new ZyPublish module lets users drag and drop to select which components — text, document images, indexes, and a run-time of the ZyLab search module — to publish to CD-ROM.

ZyPublish and the Meridian APIs are intended to let users distribute CD-ROMs as an alternative to the write-once-read-many (WORM) optical disk storage that ZyImage already supports.



ZyImage's fuzzy search capabilities make up for misspelled search terms or OCR errors by finding inexact matches.

Other new features in ZyImage include Messaging API support and Image Coding, which speeds batch processing by letting users wait until a group of documents have been scanned before viewing document images and entering key words.

ZyImage also includes an updated version of its search module, which includes fuzzy searching capabilities that finds words close to the search word but not an exact match.

"Fuzzy search capabilities are especially important for OCRed text to make up for inaccuracies," Karlin said. "It's also important to let users misspell search words and still find the text."

By the end of the year, the company will ship the fuzzy search capabilities in an update to its $395 ZyIndex text indexing and retrieval product.

ZyLab is also working on a $500 single-user version of ZyImage called ZyImage Personal Edition, due for release in November through ZyLab's VAR channel, according to Karlin.

ZyLab, a division of ZyCo International, is in Gaithersburg, Md., at (800) 544-6339.

Oracle seeks third parties to support Motion wireless tool

BY MIKE RICCIUTI

Oracle Corp. representatives kept busy at NetWorld+Interop last week drumming up third-party support for the company's newly released Oracle in Motion mobile application development tool.

Oracle in Motion shipped last week with built-in support for Woodbridge, N.J.-based RAM Mobile Data's packet radio wireless service. (See "Oracle tool revs mobile connectivity," Sept. 12, page 21.)

But Oracle representatives said the company is also working out agreements to provide competitive services in the future with additional wireless service providers, including AirTouch Cellular Data Group, in Walnut Creek, Calif.; Ericsson GE Mobile Communications Inc. of Totowa, N.J.; Motorola Inc.'s Wireless Data Group, in Schaumburg, Ill.; McCaw Cellular Communications Inc., in Kirkland, Wash.; and Los Gatos, Calif.-based Metricom Inc.

The company is also recruiting developers to create wireless applications that exploit the new system's capabilities.

Four software vendors have already signed up to build applications to run on top of Oracle in Motion, including Cordless Computer Co., based in Menlo Park, Calif. The company is readying Cordless Connection, an E-mail package that will support Oracle in Motion clients when it ships later this year.

IBM from page 19

Hopes to gain on Windows with OS/2 3.0

still hampered by several factors.

Part of IBM's OS gains in the past stemmed from the built-in Windows source code that allowed OS/2 to run 16-bit Windows applications. But compatibility with future versions of Windows is now up in the air.

IBM officials claim that if and when sufficient numbers of 32-bit Windows applications are available, the company can provide compatibility by implementing the Windows 95 API in OS/2. Microsoft sources have denied that this implementation is technically possible.

In the meantime, OS/2 still suffers from a lack of native OS/2 applications.

"Where are the applications?" Quinn asks. "The only ISV of note is Lotus [Development Corp.], and the only reason they have done it [develop OS/2 applications] is that it was part of the renegotiated deal with IBM," he adds.

IBM and Lotus last year struck a revised agreement that stipulated that IBM would continue to promote Notes and cc:Mail, and in return Lotus agreed to upgrade its OS/2 apps.

Undaunted, IBM officials continue to claim that Windows 95 will help recruit more OS/2 ISVs. Developers writing for Windows 95 will create 32-bit, multitasking, multithreaded applications. Because the OS/2 architecture is already 32-bit, multitasking, and multithreaded, IBM claims that porting programs from Windows 95 to OS/2 will be easier than porting from 16-bit Windows.

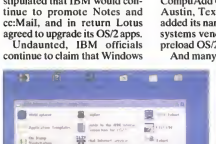
"The best thing that's happened for OS/2 is Chicago," says Wally Casey, director of marketing for IBM's Personal Software Products Division.

But ISVs respond that porting still won't be so simple. "It is a completely different API," says a development manager with a leading software house.

So far, IBM also has little news on the OEM front. Casey claims that negotiations are under way and that new OEM agreements will be announced before the Comdex trade show in November. But an IBM representative only could point to one new taker since the consent decree was issued this summer: CompuAdd Computer Corp., in Austin, Texas, which recently added its name to the list of 238 systems vendors contracted to preload OS/2 on their systems.

And many of the biggest vendors, such as Compaq Computer Corp., remain loyal to Windows. Gary Stimac, Compaq's senior vice president of the systems division, says his company has no plans to bundle OS/2.

IBM's hardware divisions have not clarified a strategy about preloading OS/2. ❑



OS/2 3.0 will ship next month with direct Internet access.

Microsoft aims high for Windows 95

Could ship 30 million first year

BY DOUG BARNEY

Even though it took Microsoft Corp. nearly 10 years to build its Windows-installed base to 60 million users, it expects to ship 20 million to 30 million copies of its upcoming Windows 95 — Chicago — in the first year alone.

These estimates, made recently during a teleconference by Paul Maritz, senior vice president in Microsoft's systems and technology division, mark the company's first official sales projection for Windows 95, now due to ship in the first half of next year.

Some analysts believe that Microsoft will not only meet these estimates, but beat them.

Betty Lyter, a vice president at Montgomery Securities in San Francisco, believes Microsoft may even top 40 million copies sold in the first year.

Microsoft is pushing OEMs to preload Windows 95.

"There is a 7 [million] to 10 million upgrade potential in the first year," Lyter said. "Then you add what OEMs sell, and I think OEMs will switch over pretty quickly."

Lyter expects that more than 40 million PCs will be sold next year, 30 million of which will be preloaded with Windows 95.

Until this month, Microsoft has been reluctant to detail its expectations for the 32-bit upgrade of its operating system.

At an analysts' briefing last July, executive vice president of sales and marketing Steve Ballmer said that the expectations of different Microsoft executives varied greatly but declined to publicly specify his own estimates.

Still, many employees on the Windows 95 development team have estimated that 7 percent to 15 percent of existing Windows users will upgrade to the new version in its first year.

Microsoft is preparing for high volumes by actively encouraging systems OEMs to preload Windows 95 instead of Windows 3.1 and pushing ISVs to release native Windows 95 applications as soon as possible after the release of the new OS.

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Versant preps development tool

Smalltalk-based Argos to build object-based apps

BY MIKE RICCIUTI

Hoping to lure developers into creating some applications for its object-oriented database, Versant Object Technology Corp. unveiled earlier this month the Versant Argos object-oriented development tool.

Due to ship in the fourth quarter, Versant Argos is based on the Smalltalk-80 language and incorporates technology from VisualWorks, an application development tool licensed from ParcPlace Systems Inc.

Argos is designed to build object-based applications that are portable across multiple operating systems and GUIs for applications running on Unix, OS/2, and Microsoft Corp.'s Windows and Windows NT.

Developers can use Argos to graphically depict how their application will work; the tool then builds the appropriate Smalltalk classes that make up the application code. Argos pricing has not been announced.

Some users foresee that Argos' primary advantage will be the time it saves on project development.

The Argos development tool helps build object-based GUIs for Versant database applications.

Ameritech Advanced Data Services, a division of the regional Bell operating company Ameritech Corp., based in Hoffman Estates, Ill., is planning to use Argos and Versant's object database to downsize its existing mainframe applications to Unix. According to Tony Mikus, Ameritech enterprise systems development project manager, Argos will cut development time from two to three years to six to nine months.

Versant, in Menlo Park, Calif., is at (415) 329-7500.

COMPONENT / from page 19

Users fear potential hassles

But as component software becomes more of a reality, some system administrators are not comforted by assurances from Microsoft and OpenDoc's developers that technical support and systems management issues will be gradually worked out in the marketplace.

Merriam and others believe that components are likely to be a bane, not a bonus, for system administrators.

For example, instead of standardizing on a lineup of third-party software that can be installed and supported uniformly across an enterprise, system administrators will mix and match components from dozens, or perhaps even hundreds, of vendors.

This leaves some users who can afford to do this kind of customization wondering who will help them fix their applications if they break and how they will update these kinds of application jigsaw puzzles.

"I'll have to be aware of which applications I happen to be using and which I can't use, and they all have software life cycles of their own," said Jim Trezzo of Trezzo Consulting in Foster City, Calif.

Other users believe that these concerns will stymie the acceptance of component software in corporations.

"I don't think [component software] will be extended into corporate development because historically, businesses haven't had the time or the discipline to develop accurate models of their business, and you can't do componentization without developing an object model," Merriam said.

Microsoft's Alger said that Microsoft and third-party vendors will provide support in the form of system services.

"There will be interoperability problems because we'll have different vendors developing different components that do similar things, but with different interfaces," Alger said.

"But some level of standardization will be determined by products that are already industry leaders," Alger added.

Alger conceded that components will place an increased burden on administrators. "System integrators will become key players in taking the pieces in a complex project and making sure they work together," he said.

Window Manager / Brian Livingston

SmartTop lets any Windows app float at 'topmost' position

One of the little-known tricks of Windows is how certain applications make themselves "float" over any other applications you happen to have on your screen.

Among the applets that ship with Windows 3.x, Windows Help and the Clock are notable for their capability to do this. If you select the Always on Top menu item in one of these applets, its window remains visible even when you switch to another application, such as a word processor. In this way, for example, you can have the Clock float over the document you're editing. Although the Clock window covers up part of your document, at least you'll always know how close your deadline is.

Strangely enough, the Always on Top item does not appear on the Clock's Settings menu. You must click the System menu icon in the upper-left corner of the normal Clock window to access this choice. (If the Clock is minimized, single-click its icon to access the System menu.) In Windows Help, for some reason the Always on Top item appears on the Help menu.

The problem for Windows users is that not enough applets support the Always on Top capability. You might want to keep the Calculator floating on top of your spreadsheet program for some quick calculations, for example. Or you might want the Character Map applet instantly available over your favorite text editor. But these applets, like most, have no such feature.

Windows programmers, of course, have long been able to add the Always on Top behavior to their applications. But this requires intimate knowledge of a program's code.

Now, however, with a tiny utility (only 63KB, including the Help file) you can take advantage of this handy trick in almost any app.

The way Windows determines which window should appear on top of all the others is called the "z-order." This priority system (sort of a Windows pecking order) governs placement decisions, such as which of the applications comes to the foreground next when you press Alt-Esc to cycle through them.

By setting itself to be first in the z-order, an application can always remain on top (and therefore, visible) even when another application has been clicked and is the "current application."

The utility that allows you to make any application topmost is called SmartTop from Shareable Software International Inc., recently acquired by Jasc Inc. The easiest way to use it is to run SmartTop as an icon.

By setting itself to be the first in the z-order, an application can always remain on top, even when another application has been clicked and is the "current application."

Start the application that you want to keep on top, then click the SmartTop icon. Choose the menu item called SmartTop-It, and then click your preferred application.

Your application will hover above all others, even when you work in a different app. To restore an app to its normal behavior, simply SmartTop-It again.

To run applications as topmost from the beginning of your Windows session, SmartTop allows you to define an icon in your StartUp group. To run Calculator topmost, for instance, you would use a command line such as:

```
smarttop.exe calc.exe
```

One quirk that can occur when SmartTop is used with certain applications is that apps sometimes start up with various introductory windows.

A subsequent window may be the actual window that you want to remain on top. In this case, you append to the command "2" or "3" or whatever to make the second or third window gain the topmost quality.

You might ask, "What happens if two or more windows think they should be topmost?" I tested this, and none of the apps "fought" to stay on top.

Each application came to the front when clicked, and all remained at least partially visible whenever I activated a non-topmost window.

SmartTop costs $14.95, plus $4 shipping. Jasc can be reached at (800) 622-2793 or (612) 930-9171 and is located at 10901 Red Circle Drive, Suite 340, Minnetonka, MN 55343.

Brian Livingston is the author of Windows 3.1 Secrets and More Windows Secrets, and coauthor of Windows Gizmos (IDG Books). Send tips to brian_livingston@infoworld.com or fax: (206) 282-1248.

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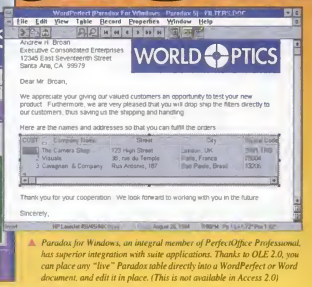

Paradox for Windows, an integral member of Perfect Office Professional, has superior integration with suite applications. Thanks to OLE 2.0, you can place any "live" Paradox table directly into a WordPerfect or Word document, and edit it in place. (This is not available in Access 2.0)

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Comparison Facts

End-user Features	Paradox 5 ✓	Access 2 ✓
Built-in "computer-based training"	✓	
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Built-in workgroup and mail capabilities	✓	
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Power and Developer Features		
OLE 2.0 client and server support	✓	
Compatibility with applications from previous version	✓	
Transparent connectivity and scalability with database glasses	✓	
Record level locking	✓	
Graphical Integrated Development Environment (IDE)	✓	
ODBC-compliant	✓	✓
Dedicated high-performance native SQL drivers	✓	

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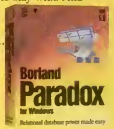

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Storage Solutions adds DAT autoloader

Storage Solutions Inc. is shipping a 48-gigabyte DAT autoloader designed to automate weekly backup for large server environments and function as a near-line storage system. The $5,000 DATa-bak 48 attaches to a SCSI host adapter and holds six DAT tapes or five tapes and a cleaning cartridge. DATa-bak 48 works with Cheyenne Software Inc.'s ARCserve, Arcada Software Inc.'s Backup Exec, and Legato Systems Inc. backup software. (203) 325-0035.

MicroNet Technology Inc. shipped Master CD, a recordable CD-ROM system for Windows. A Macintosh version will ship by year's end, company officials said. Master CD is priced at $2,498 and is available with ISA, EISA, Micro Channel Architecture, or VESA Local Bus host adapters. A PCI host adapter version will be available in September. (714) 453-6100.

LaserMaster Corp. shipped last week a $9,995 plain-paper typesetter that enables users to produce plain-paper and film proofs at the desktop. The 100-MHz Unity 1800PM-R is an upgrade of the 66-MHz Unity 1800XL-Q typesetter. LaserMaster has cut the price of the 1800XL-O to $7,995. The new typesetter produces 1,800-by-1,800-resolution copies on pages as large as 12 by 19 inches. It supports PostScript Level 2 and has 235 Type 1 fonts. (612) 944-9330.

Sharp Electronics Corp. has introduced the QA-1100, a 1.7-million-color LCD projection panel featuring 100-to-1 contrast. The thin-film transistor active matrix panel is compatible with all 640-by-480 IBM and Macintosh monitors. The $4,795 QA-1100 lets users enhance presentations using remote control to enlarge, clear, or freeze images. (201) 529-8731.

ANNOUNCED

Alaris to use NexGen chip in its products

Alaris Inc. and NexGen Inc. have announced an agreement whereby Alaris will serve as the primary developer in the U.S. market of motherboard and system products based on the NexGen Nx586 Pentium-class processor. Currently, all of Alaris' system boards are manufactured for Alaris by IBM, giving Alaris the advantage of IBM's advanced manufacturing processes. Alaris is at (510) 770-5700.

HP releases Color LaserJet

$7,295 printer offers 2 ppm color output

BY YVONNE L. LEE

Hewlett-Packard Co. will formally unveil and ship the Color LaserJet printer this week.

The $7,295 printer produces crisp blacks for standard business communications, along with dithered cyan, magenta, and yellow for presentations, newsletters, reports, and spreadsheets.

The Color LaserJet has separate toner containers for each color, so users don't have to replace all four colors when one runs out. The printer produces flat matte output, giving a common look for monochrome and color pages.

It prints monochrome pages at 10 pages per minute (ppm), color pages at 2 ppm, and color transparencies at 1 ppm. This is considerably faster than color inkjet printers, which print at .5 to 1 ppm, according to product manager Robert Horton.

While the base model works with PCs only, a $799 PostScript Level 2 module makes it possible for the printer to work with Macintoshes and Unix workstations as well.

The standard feed tray holds 250 sheets, and an optional rear-feed paper feeder holds an additional 250 sheets.

Additional paper trays are available that hold sheets from letter size through 11 by 17 inches. The printer can print 11-by-17-inch pages in monochrome only.

The base model Color LaserJet includes HP PCL5 with Color, 8MB of RAM, and a bidirectional parallel port.

Three network cards support Ethernet, LocalTalk, and Token Ring networks. The HP JetDirect card for Ethernet and LocalTalk is $429; the JetDirect card for Ethernet only is $369; and the Token Ring card is $619.

Palo Alto, Calif.-based HP can be reached at (800) 752-0900.

HP's first color laser printer, the $7,295 Color LaserJet, offers 2 ppm color printing and 10 ppm monochrome output.

Innovative features set Aptiva apart

IBM releases seven models as PS/1 replacement

BY CATE T. CORCORAN

IBM this week replaces its PS/1 consumer line with seven PCs under the brand name Aptiva.

The Aptiva line is typical of the fall crop of consumer PCs in that it comes standard with multimedia subsystems and includes a custom, easy-to-use interface. But IBM has also added a number of innovative productivity features, such as the capability to receive faxes when the systems are turned off.

Estimated street prices range from $1,199 for a 486SX2 to $2,599 for a 60-MHz Pentium, without a monitor. Hard drive options range from 270MB to 720MB.

All the systems include a scheduling utility that lets users program their machines to automatically perform tasks at a certain time. For example, with the Scheduler, users can set their computers to download information or send faxes during the night.

The system turns itself on when it receives a signal from the Scheduler or when the phone line rings. Users on the road can take advantage of the system's capability to turn itself on to download files from their hard drives to their laptops over the phone.

To do this, both the portable and the desktop system need IBM's Online Housecall remote diagnostic software, which comes standard.

Multimedia and communications capabilities come standard on each machine in the form of a 16-bit Creative Labs Inc. Sound Blaster sound card, a double-speed CD-ROM, speakers, and a fax modem. Motion video CD-ROM software is one of about 40 programs included.

Some systems also have 30-watt speakers, telephone answering capability, and voice-command software.

Three-year warranties are standard on the systems.

Configurations include the Aptiva 530 with a 486DX2/66, a 424MB hard drive, and 8MB of memory with four slots and four bays for about $1,899. The 530 has voice-command software, support for Plug and Play, a wave-table audio card, and a Super VGA local bus GUI accelerator with 1MB of DRAM.

The Aptiva 350 minitower system has a 486DX2/66, a 540MB hard drive, six bays, and eight slots for about $1,699.

IBM, in Armonk, N.Y., is at (800) 426-2968.

The Aptiva line includes a 350 minitower 486-DX2/66 with 540MB drive for about $1,699.

Zenith puts Pentiums in servers

BY BOB FRANCIS

ATLANTA — Powered by up to four Pentium processors, the new Z-Server GT series from Zenith Data Systems is designed for applications requiring high availability and high performance processing.

The servers, announced last week at NetWorld+Interop, can be configured for one, two, three, or four 90-MHz Pentium processors and use Intel Corp.'s MPS 1.1 multiprocessing specification. Current operating systems that support the MPS 1.1 specification include SCO Unix and Windows NT.

Maximum RAM for the systems is slightly more than 1 gigabyte and disk storage expands to 24 gigabytes, Zenith said.

When used as a symmetrical multiprocessing system, the Z-Server GT automatically balances CPU requests across the multiple processors to alleviate bottlenecks and performance degradation found in single-processor file servers, according to Zenith officials.

The Z-Server GT includes a series of fault-tolerant features as well as a three-year, limited on-site warranty. Among the fault-tolerant features are error-correction code memory, hot-pluggable disk drives, server management, and support for RAID Levels 1 and 5.

The system includes three EISA slots, two PCI slots, one dual PCI/EISA slot, a Fast and Wide SCSI-2 controller, local bus graphics, upgradable BIOS, a floppy controller, six 5.5-inch drive bays, two 3.5-inch drive bays, two serial ports, and one parallel port.

A Z-Server GT Model 1 with a single 90-MHz Pentium processor, 32MB of ECC RAM, 1-gigabyte hard disk storage, and a CD-ROM drive is expected to be priced at $14,000.

Analysts said Zenith's new high-end server gives the company a product to compete with high-end servers from vendors such as Compaq Computer Corp.'s ProLiant 4000.

"The technology on Zenith's servers has always been solid and sometimes innovative. The biggest problem has been users actually finding where to buy the systems," said John Dunkle, president of Workgroup Technologies Inc., a research group based in Hampton, N.H.

Zenith, a division of Groupe Bull, is in Buffalo Grove, Ill., at (800) 533-0331.

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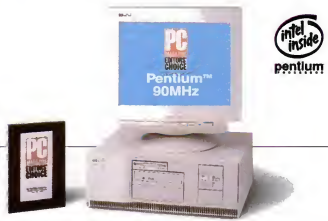

On June 28th, PC Magazine announced its Editors' Choice Awards. We'd like to thank them for making the HP Vectra XU PC a winner, and for doing an excellent job of writing this ad. For additional reading materials, call us today at 1-800-322-HPPC, Ext.8518.

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HEWLETT PACKARD

NexGen challenges Intel

Nx586 chips rival Pentium performance

BY BROOKE CROTHERS

Intel Corp.'s monopoly in the Pentium-class processor market has officially been terminated as NexGen Inc. begins shipping its Nx586 processors this week.

The P100, P90, P80, and P75 Nx586 processors are available immediately and offer performance on par with, or better than, Intel's Pentium processors, according to the company.

NexGen has taken a different tack than Intel by not matching the processor classification precisely to clock rates.

The P100 runs at 94 MHz, the P90 at 84 MHz, the P80 at 75 MHz, and the P75 at 70 MHz.

NexGen claims that, based on performance for applications, its P100 and P90 match Intel's 100-MHz and 90-MHz Pentiums, and its P80 and P75 surpass Intel's 66-MHz and 60-MHz Pentium processors.

The NexGen chip is also radically different from the Pentium in a number of areas.

Users have the option of getting a processor with a floating-point unit built in, or they can save money and opt for a chip with only the main processor.

The cache controller for the Level 2 cache is built into the Nx586, delivering increased performance.

The processor also has 32KB of on-chip (Level 1) cache, as opposed to the Pentium's 16KB.

The chip uses a novel RISC-like microarchitecture that takes standard x86 instructions and decodes them into NexGen's RISC86 instructions.

The Nx586 processor adheres to RISC principles such as fixed instruction length and large register sets, and it implements advanced techniques such as out-of-order execution.

Some vendors will be shipping systems that use the NexGen processors immediately.

Features unique to NexGen's Nx586

- Fast Level 2 cache design
- Cache controller on chip
- RISC-like execution
- Optional floating-point unit
- Higher performance at lower clock speeds

Fremont, Calif.-based Alaris Inc. will offer systems that can use any of the Nx586 processors. A system with a P75 Nx586, VESA Local Bus, 256KB of Level 2 cache, and a 420MB hard drive will list for $2,289. Systems based on the PCI bus will be available from Alaris in the first quarter of 1995.

Tangent Computer Inc., based in Burlingame, Calif., will sell a system based on a P90 Nx586 processor with local bus graphics, 256KB of cache, a 14-inch monitor, a 340MB hard drive, and a dual-speed CD-ROM drive for $1,999.

Prices for the NexGen processors start at $404 for the P75 and range up to $777 for the P100.

NexGen, in Milpitas, Calif., can be reached at (408) 435-0202.

Conner announces tape backup

BY BOB FRANCIS

Conner Tape Products Group will announce next week a 420MB tape backup system for stand-alone PCs and workstations, company officials said.

The TapeStor 420 internal tape backup device, a new member of the Conner TapeStor line, supports both regular quarter-inch cartridges (QIC) and QIC-Wide tape.

With regular QIC tape, the system's capacity is 250MB, company officials said. With QIC-Wide tape the system's capacity is 420MB.

Conner Tape Products, a Costa Mesa, Calif.-based division of Conner Peripherals Inc., will supply both retail and OEM versions of the TapeStor family, which includes capacities as high as 4 gigabytes on high-end models.

The TapeStor 420 internal backup system includes a tape drive, Conner Backup Exec software for DOS and Windows, a Sony QIC-Wide tape cartridge, installation hardware, and documentation.

An external parallel port model has an integrated auto-sensing power supply that eliminates the need for a wall adapter when used in foreign countries.

The 420's tape drive writes data at rates as high as 9.5MB per minute and is capable of either a 500Kbps or a 1Mbps data transfer rate, depending on the floppy controller.

The system will be available next week with a suggested price of $199 for the internal system and $369 for the external parallel-port model.

Conner and Sony Corp., which supplies the tape cartridges, have been pushing the QIC-Wide standard since last year.

Though the technology has been slow to take off, Bob Abraham, an analyst with Freeman Associates in Santa Barbara, Calif., said it is likely to gain more general market acceptance next year.

Conner can be reached at (714) 641-1230.

The TapeStor 420MB backup device supports QIC and QIC-Wide tape.

InfoWorld Street Prices

17-inch color monitors

Model[1]	Dot pitch	Low	High	Average
Apple Multiple Scan 17	.26mm	$919	$999	$983
CTX-1765GM	.28mm	$648	$796	$683
KFC CA-1718	.26mm	$685	$799	$739
Mag InnoVision DX17F	.26mm	$655	$754	$697
Mitsubishi Diamond Scan 17FS	.28mm	$879	$1,015	$941
Nanao FlexScan F550W	.28mm	$889	$1,200	$997
NEC MultiSync 5FGp	.28mm	$1,055	$1,200	$1,100
Nokia Multigraph 447B	.26mm	$858	$999	$921
Sony CPD-1730	.23mm	$919	$1,056	$969
ViewSonic 17G	.28mm	$715	$869	$797

InfoWorld street prices are based on telephone surveys of resellers and print advertising in computer publications and regional newspapers. Price information was collected between Sept. 4 and Sept. 10.

[1]All displays are flat-screen, noninterlaced, multifrequency, MPR-II compliant, and have a maximum resolution of 1,280 by 1,024, except for the Sony model, which has a maximum resolution of 1,024 by 768.

Panasonic readies notebook

Lightweight V41 offers full-size CD-ROM

Panasonic Personal Computer Co. last week introduced the lightest notebook to include a full-size CD-ROM drive.

Designed for presentation and database applications, the 8.4-pound V41 computer has most of its CD-ROM circuitry integrated with the notebook's circuitry to save weight. Other portables with CD-ROM drives and notebooks with portable CD-ROM-equipped docking stations weigh at least 13 pounds.

The V41, which ships Oct. 12, has storage space for an extra CD and includes software to play audio or photo CDs. It comes with a 10.4-inch active or passive matrix color screen and will have an Intel 486DX2/50 or 100-MHz 486DX4 processor. A version with a 3.3-volt 75-MHz Pentium chip is due later this year.

The notebook will ship with 4MB, 8MB, or 16MB of RAM on the motherboard, which can be upgraded with memory cards. Hard drives of 260MB and 450MB will be available immediately, with a 680MB drive due in November.

The V41 has an internal "sub-battery," which is the main source of power, and a hot-swappable battery that plugs into the floppy drive slot and runs twice as long. It has two stacked Type II PCMCIA cards that can hold a Type III device.

Pricing starts at $4,299 for a DX2-based model with passive matrix display, 260MB hard drive, and 4MB of RAM. The active matrix color base model with 8MB of RAM costs $5,799.

Panasonic, in Secaucus, N.J., can be reached at (800) 742-8086.

—Yvonne L. Lee

Panasonic's 8.4-pound V41 notebook includes a full-size CD-ROM drive.

Acer leads next-generation Pentium race

Acer America Corp. is leading the charge into the second generation of Pentium systems with low prices, large hard drives, and integrated multimedia subsystems standard on every machine.

Last week the San Jose, Calif.-based company shipped six desktop and minitower models that it estimates will range in price from $1,199 to $2,500. Acer does not set list prices.

At the top of the line is an AcerPower minitower system with a 90-MHz Pentium processor, 8MB of memory, an 810MB hard drive, a 32-bit Cirrus GUI accelerator chip, 1MB of DRAM, and a PCI local bus, for about $2,500.

The system comes with a 14.4Kbps fax/modem, telephone answering machine capability, a double speed CD-ROM drive, speakers, and a 16-bit Sound Blaster-compatible sound card.

Other minitower systems include the AcerPower 60-MHz Pentium system, with a 420MB hard drive, 8MB of RAM, and a 256KB cache for $1,899.

An AcerAcros 4370 space-saver system with a 50-MHz 486SX2 processor and a 340MB hard drive will cost about $1,199. The same system with a 540MB drive and a 66-MHz DX2 processor will cost about $1,699, Acer said.

All the systems come with a variety of software programs, such as Microsoft Works, Quicken for Windows, and Internet access software, as well as an easy-to-use menuing interface called the Acer Computer Explorer, which can be used in place of Windows.

Acer is at (408) 432-6200.

—Cate T. Corcoran

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NEC readies Versa notebooks with top-of-the-line screens, modularity

486DX4-based models to ship in September

BY YVONNE L. LEE

NEC Technologies Inc. last week introduced new Versa notebooks that boast the most advanced screens currently available on an Intel-based or equivalent notebook.

The Intel 486DX4-based Versa M series notebooks will be available with a choice of four screens, including an 800-by-600-resolution active matrix display and a 640-by-480-resolution display that shows 16 million simultaneous colors.

These high-end screens are suited for presentations, financial applications, portable engineering applications, and graphic design, according to the company.

The other two displays that will be available with the Versa M series notebooks are the more common 8.5-inch active matrix 640 by 480 with 256,000 colors and a dual-scan passive matrix display.

The models with standard screens are due to ship in mid-September, while the advanced screen versions are set to ship at the end of the month.

The new notebooks also have increased modularity for greater ease of use. Users can now swap out the floppy drive and insert additional PCMCIA slots or a video tuner. With previous models, users could replace the floppy with an additional battery only.

NEC's Intel 486DX4-based Versa M notebooks offer a choice of screens, including an 800-by-600 active matrix display.

All configurations of the Versa M notebooks except the dual-scan passive matrix model are available with a 75-MHz or 100-MHz processor.

The Versa M series notebooks ship with 250MB, 340-MB, 540MB, and 810MB hard drives.

The notebooks are bundled with Windows Sound System and Run-Time Video for Windows software.

Pricing starts at $3,949 for a 75-MHz 486DX4-based model with passive matrix display and 250MB hard drive.

At the high end, a model with an 800-by-600-resolution display, 100-MHz processor, and 810MB hard drive has a list price of $6,799.

A docking station with CD-ROM drive, speakers, SCSI interface, and Sound Blaster-compatible audio is due out in the fourth quarter, the company said.

NEC, based in San Jose, Calif., can be reached at (800) 632-4636.

Monitors will soon offer easier setup

VESA finalizes display standard

BY CATE T. CORCORAN

The Video Electronics Standards Association last week finalized a standard that will ease monitor setup for users.

The Display Data Channel (DDC) specification defines how information about a monitor's characteristics is sent to a system. If a user plugs a DDC monitor into a DDC system, the system will automatically configure the monitor to a high resolution, such as 800 by 600, and high refresh rates, such as 72 hertz, rather than the current but outdated VGA standard.

Exactly which resolution will be the default resolution will depend on the size of the monitor and is determined by the monitor maker, said Anders Frisk, chairman of the VESA Monitor Committee and a systems architect with ICL Personal Systems.

Currently, when users plug a monitor into most systems they automatically bring up VGA, which measures 640 by 480 pixels with a refresh rate of 60 hertz. Such a low refresh rate produces a noticeable flicker.

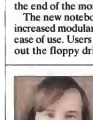
Setting up a nondefault resolution will also be easier under the new standard, which complies with Microsoft Corp.'s Plug and Play specification. In fact, Microsoft is likely to include a monitor utility in the next version of Windows that will let users choose only those resolutions and refresh rates supported by their particular equipment, Frisk said.

Systems and monitors supporting the DDC standard are expected to be widely available by spring Comdex next year.

The DDC standard also includes an optional second level of specifications for controlling monitor settings from the system. A smaller number of monitor makers are expected to support this level of DDC, which will enable users to control things such as horizontal and vertical position and color calibration on their monitors.

> **The spec defines how information about a monitor is sent to a system.**

A handful of monitor makers already allow their users to control these settings in software, but the way the information is communicated to the monitor is proprietary.



Help Desk / Brett Glass

Multiple small servers can take the burden off a super server

Q. Is it better to have one "super" server or several smaller ones on a Novell Inc. NetWare LAN? A look in the back of *InfoWorld* shows that a mail-order Pentium workstation costs as little as one-fourth the price of a high-end server machine, so we have been tempted to split the work among three or four servers rather than relying on just one. Is this the right way to go?

Larry Cotrell

A. Before you buy a $25,000 super server, it really does pay to look into getting several smaller ones instead. Because of the way the NetWare protocols are designed, an overburdened server can throttle the response time of the entire network. Multiple servers operating concurrently will make it less likely that any one server will become a bottleneck.

You can ease network congestion if you split your LAN into segments, place intelligent bridges between the segments, and keep each server and its users together on the same segment. You can even provide better security by limiting each employee's access to his or her group's server.

Multiple servers also provide a form of redundancy that even "fail-safe" servers — with mirrored disks, redundant arrays of inexpensive drives, and hot-pluggable parts — can't match. Even the most heavily armored, redundant, or mirrored server can still fail completely under certain circumstances (if lightning strikes, the equipment closet floods, or the building catches on fire), becoming a single point of failure for your entire company.

But multiple servers, located at separate sites or even just in separate offices, may be more resilient and can help you get through such a failure. For example, if your order-taking operation is split among several workgroups or offices with their own servers, you can shift personnel and keep going if one server goes down.

What are the disadvantages of multiple servers? Well, first of all, you'll need some redundant hardware — such as extra uninterruptible power supplies. If you segment your network, you'll also need bridges or routers. And you'll have a more complex backup schedule (although the latest automated backup software can back up several servers onto a single tape to ease this problem). Finally, if there is a user who needs to connect to several servers to do his or her work, the configuration for that user (batch files and so on) will be more complex and may take up more memory on the workstation. But now that most network management utilities automate the tasks associated with multiple-server administration (such as making combined backup tapes or copying a user's security information from server to server), these logistics are no longer an impediment to setting up multiple servers.

Q. I'd like to run OS/2, but our site runs an Artisoft Inc. LANtastic network. Unless I'm mistaken, there does not appear to be built-in network support in OS/2. Is there any way I can run OS/2 with a LANtastic network?

Jim Mullins

A. OS/2 does not come with bundled network software today (though rumor has it that this will change with the next release). However, IBM's LAN Server — which is designed to interlock with the new OS/2 operating system — provides the software. What's more, the latest version of LANtastic — Version 6.0 — has universal support for several variants of the Server Message Block (SMB) protocol and is thus interoperable with LAN Server. This means if you're running IBM's LAN Server software, you can connect LANtastic clients to the IBM server and vice versa.

If you prefer to use TCP/IP (the best choice if you plan to have many types of machines on your network or want to connect to the Internet), IBM and several other vendors make TCP/IP implementations for OS/2; they all interoperate with Artisoft's LANtastic for TCP/IP product. (For a comprehensive look at 13 TCP/IP products, including three for OS/2, see product comparison, Sept. 12, page 68.)

Brett Glass' Help Desk answers business computing questions. Readers can leave queries by calling (800) 227-8365, ext. 702, or by messaging CompuServe at 72267,3673.

INTERNATIONAL DATA CORPORATION

IDC Insight: An Ex

Boosting Productivity Throu

Sponsored by Dell Co

Salespeople working out of briefcases access customer records in an instant; service technicians working out of panel trucks carry fewer spares; auditors migrating from customer site to customer site spend more time with clients.

Indeed, companies that routinely equip their mobile field workers with mobile computers reap significant productivity gains as a result.

These are some of the conclusions of a recent study of more than 400 large and medium-sized U.S. organizations involved in field force automation. The study was conducted by International Data Corporation (IDC), the world's leading information technology market research firm.

An in-depth summary is available in a special IDC White Paper on Field Force Automation (see box, bottom far right).

> Organizations successfully automating their mobile field forces are reaping significant increases in productivity and gaining competitive advantage.

Information technology professionals understand the challenge of automating mobile workers. Technical support, training, and system management are different for mobile workers than for their office-based peers. The autonomy of field workers makes implementing enterprise systems and procedures more complex. According to the IT professionals polled, one of the challenges easiest to underestimate is field force resistance to change.

Study Findings

- Over 70% of large and medium-sized companies are in some phase of field force automation.
- IT professionals saw productivity improvements as the key benefit of field force automation.
- Over 25% of respondents feel they are ahead of their peer companies and gaining significant competitive advantage as a result.
- Almost 60% of the respondents feel their automation efforts had met or exceeded expectations.
- Key success factors include top management support, training, and a good working relationship between the departments involved.

Figure 1 — The Key Benefits of Field Force Automation

IDC Survey Results, Mid-1994, N=206

The benefits of taking on the challenges of mobility, however, are clear, as illustrated in Figure 1. They extend from more service calls per day and more time with sales prospects to better customer service through improved order turnaround. Some companies also see direct financial returns, like increased revenue and profitability.

Keys to a Winning Implementation

If increased productivity is a key goal of field force automation, what are the key steps to achieving it? IDC asked those whose field force automation projects had exceeded expectations to rate critical success factors (see Figure 2).

Comparing their responses with the sample as a whole suggests that key factors that differentiate an implementation that exceeds expectations from one that merely meets them include top management support, clearly defined requirements, cooperation between IT professionals and end users, and hardware vendor support.

None of these factors exists in a vacuum. Field force automation requires a systematic approach to applicatio development, technology acquisitio training, support, and even intern selling. Most companies spen practically as much time in pla ning—almost half a year—as they d in the rollout of the application.

Although much of the software ru ning on the mobile computers used b field forces is shrink-wrapped—wor processing, spreadsheets, schedulers— much is custom developed Developing a successful field forc automation application requires all th rigor demanded by any enter prisewide, mission-critical application

Working in Concert

Developing a field force applicatio also means working in partnershi with user departments. Obtaining to management support requires com mitment from both IT professiona and end users; implementing th application requires ongoing cooper tion. IT professionals and end-use department managers polled for th most part agreed on goals and benefit but differed on some critical points:

ecutive Briefing

gh Field Force Automation

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Figure 2 — The Keys to Successful Field Force Automation

Multiple responses allowed

User managers saw more need to improve communications with the field.

IT managers saw more need for cooperation with user departments.

IT managers were more worried about hardware availability.

User managers expected implementation to take 30% longer than MIS did.

Finally, IT professionals tended to worry more about logistics, support, and technical issues—the areas in which study respondents most often ran into unexpected problems. Multiyear, multisite, multiversion applications are not easy to roll out.

oing Forward

Like any potentially mission-critical enterprise application, field force automation requires continual investment (see box, upper right). New employees must be trained, the applications expanded and upgraded, and new equipment installed.

New functional areas are also open for automation—70% of the companies interviewed were automating more than one functional area. The sales function is the most likely to be automated. Following sales are accounting/auditing then maintenance and repair. Other automated field activities include insurance claims adjusting, project consulting, mortgage lending, and field research.

The mission-critical nature of field force automation and the likelihood of continued application evolution lead to the final success factor: an organization's relationship with its supplier and its choice of technology. In field force automation, the supplier of notebook computers must be a full business partner.

The supplier needs to be in the market for the long haul. Its service and support must be up to mission-critical standards, its product line continually refreshed, and its reputation and viability as a company must be beyond concern.

It must also recognize the user's need for programmed upgrades, asset management, and ongoing logistical support. With the average field force automation project taking almost two years, from design through full rollout, several product generations may occur during the life of the project. The right vendor is geared for volume fulfillment and support across time and distance.

The computer itself must be reliable, portable, and available when and where needed. It must also have the connectivity to operate in an enterprise computing setting.

Only after a vendor and its products match these criteria should price enter the equation. The cost of the hardware is, after all, a small part of the total implementation cost.

The Call to Action

The paybacks reported by companies with automated field forces should motivate others to increase their own pace of automation. The success of field force automation relies on skills and experiences built over time, meaning it is essential to automate sooner rather than later. Organizations not automating or upgrading now run the risk of falling even further behind.

Maintaining the Edge

Once a field force automation application is up and running, success factors change. Leading-edge companies considered the following most critical:

- Continual upgrading of hardware and software: 31% of respondents
- Continual investment in training: 25%
- Ongoing support for end users: 20%
- Management support: 16%

If there's a single message, it's this: field force automation is no longer an experiment in technology. It's a mainstream way of doing business.

– John Gantz
Senior Vice President
International Data Corporation

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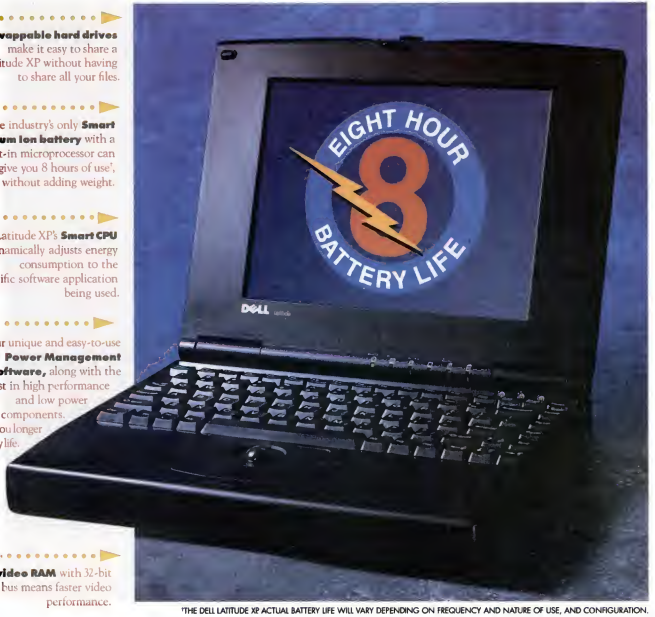

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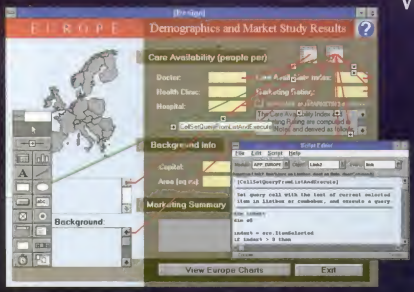

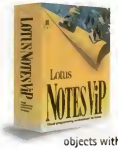

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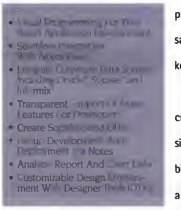

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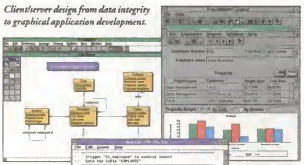

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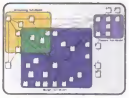

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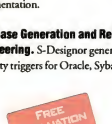

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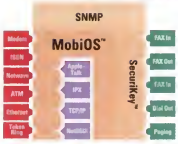

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Soft Sentry offers license management

Microsystems Software Inc. is shipping Soft Sentry, a license metering and software management tool. Priced at $595 per server (or a 250-user) license, the package combines transparent license and cursor control with the capability to block any application, including those running in PC local drives. Soft Sentry runs on NetWare, Banyan Vines, Pathworks, LAN Server, and LANtastic. (508) 879-9000.

Avalan Technology Inc. is shipping Remotely Possible/Sockets, a remote control, file transfer, and chat software package that supports TCP/IP via the Windows Sockets interface. The product, priced at $298 for a 20-user license, allows PC users to access TCP/IP over other TCP/IP products from Microsoft Corp., Novell Inc., IBM, and FTP Software Inc., among others. (508) 429-6482.

Rhintek Inc. has launched a "public beta test" of its Rhino general communications package for OS/2. The package handles modem and direct communications and contains ANSI and VT-100 terminal emulation. The beta also comes with the Rexx scripting language. Rhino is slated to ship in a commercial version by year's end. Answering a brief questionnaire is required to obtain a free copy of the beta software; call (410) 730-2575.

EasySpooler is shipping EasyNet, a Unix-based software package that allows PC users to manage remote printers connected to any network via TCP/IP. Shipping now, starting at $995, it offers a menu-driven interface for managing remote print jobs, including forms control, start and restart procedures, and trash can recovery of remote print jobs. It can interrupt and restart a print job according to page number. (214) 522-2324.

ANNOUNCED

IMC Networks plans fault-tolerance line

IMC Networks has announced a family of small fault-tolerant Ethernet transceivers. FT-LANceiver measures 4 inches by 4 inches by 1 inch. The architecture provides dual-path protection: one path for the active (or on-line) connection and one for backup. FT-LANceiver will ship in October, starting at $445. (714) 724-1070.

Infonet will ship E-mail management

BY DOUG VAN KIRK

Aiming to fill a noticeable gap in E-mail management, Infonet Software Solutions Inc. later this month will ship a centralized message management console that can monitor and control the company's Messenger 400 E-mail system.

Messenger 400 Management Control Center (MCC) can display message traffic information and relay local alarms back to a central administrator. In addition, MCC can configure and manage Infonet's Messenger 400 servers regardless of their location in an enterprise.

Despite the fact that MCC, for now, works only with Infonet's Messenger 400 servers, analysts said MCC could provide a glimpse of the kind of message management features that are likely to be included in the future with client/server mail systems from Microsoft Corp., Lotus Development Corp., and Novell Inc.

Although these firms have disclosed few details about their products' management capabilities, users have made it clear that they expect end-to-end message tracking, billing and auditing features, and the ability to configure and control remote message servers from a central location.

Messenger 400 is Infonet's Unix server-based X.400 messaging system. MCC, which will run on Sun workstations, will cost $10,000 to $30,000, depending on the installation's size.

"This makes [Infonet] one of the more advanced messaging systems," said Sara Radicati, president of the Radicati Group, a Palo Alto, Calif., consultancy. Radicati cited the use of Madman (Message and Directory Management), the SNMP-compatible Management Information Base, as one of Infonet's key features.

Infonet's approach

- Captures number of messages sent/received
- Displays volume of messages (in bytes)
- Displays graphical statistics
- Enables threshold settings
- Lets administrator set logging level on remote systems

SOURCE: INFONET

Madman lets administrators see the rate of rejected or lost messages, monitor traffic levels and connection status, and determine the overall volume of messages in a system — all from an SNMP-based management console, such as Hewlett-Packard Co.'s OpenView.

"Madman is the closest thing we have to a standard for message management right now," Radicati said.

If other messaging vendors support the standard and write agents compatible with MCC (for configuration and control functions), Infonet's console could become the first cross-platform message management system.

Though use of Madman is not widespread at this time, it was endorsed by major vendors participating in the Message Management Council, an industry group formed by Microsoft earlier this year that has since become an arm of the Electronic Messaging Association (EMA). The EMA is currently working on a messaging management standard that will build on Madman, Radicati said.

Infonet, in Burnaby, British Columbia, is at (604) 436-2922.

MiraLink mirrors servers for real-time LAN access

BY CATE T. CORCORAN

MiraLink Corp. next month will bring mainframe-type fault tolerance to LANs with a product that mirrors off-site data in real time.

Introduced last week at NetWorld+Interop, the Off-SiteServer is aimed at banking, insurance, and other industries where data loss is catastrophic. It works with Novell Inc. NetWare and lists for $19,950.

Off-SiteServer includes software and two rack-mountable units. One unit remains at the host site and is connected to the second, a remote unit, via a dedicated T1 or E1 telephone line, making the system safe from any disaster that may befall the host area. Each unit includes a 500MB hard disk buffer to ensure good network performance and guard against data loss.

"Right now there are a lot of mainframe and minicomputer products that do what this does, but Off-SiteServer is relatively unique in a LAN environment," said Jim Greene, an analyst with BIS Strategic Decisions, in Norwell, Mass.

Should the host server crash, the Off-SiteServer can also be used to bring the network back up after a delay of about 10 minutes, MiraLink said.

Each Off-SiteServer device measures 1.75 by 15 by 19 inches and features an LCD display to report transmission status and other diagnostic information.

Each unit also contains four 16-bit transputers operating in parallel with 64KB of RAM each, a 40-watt power supply, and two RJ-45 connectors.

MiraLink, in Orem, Utah, is at (801) 221-1862.

MiraLink's OffSiteServer comes with a 500MB hard disk buffer to safeguard network traffic from data loss.

Egghead, AT&T offering software catalog on-line

Links via NetWare, Notes servers

BY DOUG VAN KIRK

ATLANTA — Egghead Software introduced last week at NetWorld+Interop the first software application for AT&T Network Notes — an electronic software catalog that will bring the company's extensive product list to customers.

Announced earlier this year and slated to be completed by mid-1995, AT&T Network Notes is a network of public and private Lotus Development Corp. Notes servers, linked via Novell NetWare.

Egghead and AT&T will begin testing the catalog next month with selected customers of the two companies. Portions of Egghead's 20,000-item catalog, tailored for each customer, will be placed in Notes databases and replicated to customer sites, explained Bryan Williams, director of value-added products and services for the Issaquah, Wash.-based software seller.

In the test, customers will be able to see lists of software titles and descriptions, purchase software, and find out the status of orders, Williams said. If customer reaction is favorable, Egghead could add features such as product demonstrations, multimedia presentations, technical knowledge bases, and electronic software distribution.

Users won't have to pay for the service during the trial because AT&T will pick up the tab, Williams said.

However, Egghead is evaluating methods of charging for access in the final versions, Williams said the company wouldn't make users pay a fee for viewing the catalog or ordering software, but use of additional services, such as a technical support database, could incur charges.

Customers can view software titles and make purchases.

According to Williams, Egghead had been investigating private network options for distributing software but elected to go with Network Notes because of easy administration, comprehensive security, and the large installed base of Notes users.

Egghead is at (800) 344-4323.

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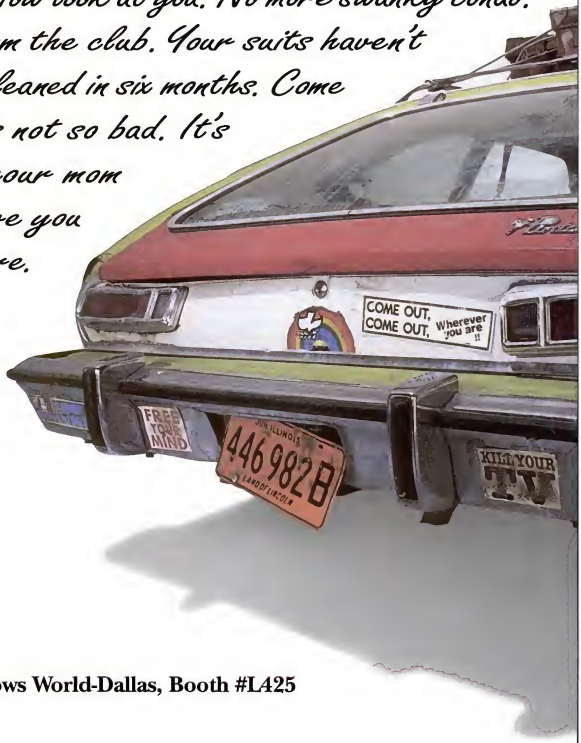

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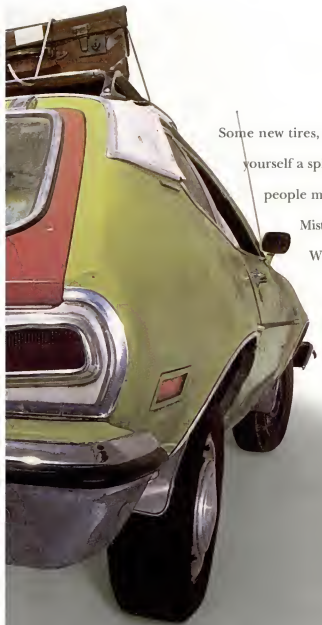

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NEC

SkyCard Messenger displays lists of incoming pages and includes links to Microsoft Mail and Lotus' cc:Mail.

SkyTel PCMCIA card weds Windows paging, E-mail

By Doug van Kirk

Road warriors won't be able to use inconvenience or lack of integration with other equipment much longer as excuses for not carrying a pager.

SkyTel Corp. will introduce this week SkyCard for Windows, a combination PCMCIA-based pager card and messaging software for portable PCs.

SkyCard lets users tap into one-way paging services, including news briefs and standard alphanumeric pages. Users can insert the card to retrieve pages when they want; no rebooting is necessary.

The $249 product, which will be available by the end of the month, consists of a Type II PCMCIA card with a battery holder and a status light at the end of the card.

The card continues to receive pages when it is removed or the PC is turned off, and a status light indicates that pages are waiting.

SkyCard comes with SkyCard Messenger, a messaging program that borrows heavily from other Windows messaging programs, complete with folders, auto-executing rules, and support for DDE client applications.

SkyCard Messenger will be delivered with sample macros for Microsoft Excel that demonstrate near-real-time updates of a spreadsheet based on stock prices. In addition, the program Microsoft Mail and Lotus' cc:Mail.

SkyTel, in San Jose, Calif., is at (408) 451-3900.

Paradyne's upgradable V.34 modem saves connect fees

By Bob Wallace

Modem heavyweight AT&T Paradyne Corp. will ship next month a dial-up 28.8Kbps modem, the Comsphere 3800 Plus, that can be easily upgraded free of charge to support speeds as high as 33.6Kbps by December.

The Comsphere 3800 Plus will cost $1,195 and is compliant with the ITU's V.34 standard for interoperability of 28.8Kbps modems.

In December, Comsphere 3800 Plus customers can dial AT&T Paradyne's special 800 number and the vendor will download the software needed to support the 33.6Kbps speed over a regular telephone to the modem.

"That would make it the fastest modem out there," said Lisa Pelgrim, an industry analyst with Dataquest, a San Jose, Calif., consulting and research firm. "It'll be especially good for users who need bandwidth approaching that of ISDN but can't get that service where they need it."

Don Cooper, senior vice president of AT&T Paradyne, said the 15 percent increase will speed transmission time and save users in WAN connection charges.

Areas that stand to benefit from the increase in modem speed include telecommuting, mobile computing, access to online information services, as well as mid-speed conferencing, Cooper said.

AT&T Paradyne will sell the Comsphere 3800 Plus through its direct sales force and through VARs.

AT&T Paradyne, in Largo, Fla., can be reached at (813) 530-2000.

Motorola plans global, cellular net

Object-oriented software links voice/data/fax services

By Elizabeth Heichler

Next spring, Motorola will start testing object-based communication software that will lie at the heart of the world's first international wireless voice/data network.

Motorola's Iridium satellite cellular network, slated to go on the air in 1998, will provide global, wireless hand-held telecommunications services including voice, fax, data, and paging via 66 lightweight satellites in low earth orbit. The satellites will be in six orbital planes of 11 satellites each, positioned about 420 nautical miles above the earth. The first satellite will be launched in 1996; the satellites will be interconnected to provide complete coverage of the earth's surface.

But even though "switch on" is four years away, the software to control it must be ready long before that, especially if applications will be available to run over the network, said David Castillo, lead software designer of the system control segment of Iridium. His team will deliver major pieces of the project in phases beginning in early 1995 for tests in May.

Toward that effort, Iona Technologies Ltd., based in Dublin, Ireland, will deliver the CORBA-compliant object-oriented technology, a key element of the communication software, Castille said.

Iona's implementation of the Object Management Group's Common Object Request Broker Architecture (CORBA) specification is called Orbix; it will provide communications among software applications distributed over a network.

"Orbix is the backbone. It's one of the most important pieces of software we're procuring," Castillo said.

Object technology was decided upon, Castillo said, to make different pieces of software — some legacy, some off-the-shelf, and some newly developed — work together.

Iona's Orbix will be used in software for the Iridium ground stations, to control and monitor navigation and telecommunications switching. It may also provide bridging technologies to conventional earthbound computer networks.

"What we liked about Orbix is that it is well designed and has so many hooks to other systems," Castillo said. "We can integrate DCE [the Distributed Computing Environment], and Kerberos, for example. And it's also very true to the C++ mind set and philosophy."

Elizabeth Heichler is a London correspondent for the IDG News Service.

HP unveils plans for ATM interface, products

By Bob Wallace

Hewlett-Packard Co. will begin supporting Asynchronous Transfer Mode (ATM) in November with the release of an interface for its HP 9000 computers. Other add-in cards and modules for existing products will follow in 1995, with high-speed switching later.

Priced at $1,995, HP's 5700 Workstation EISA OC3 adapter will enable users with HP's 9000 Series 700 workstation to support ATM transmission at 155Mbps over multimode fiber with unshielded twisted-pair support in early 1995.

The EISA adapter comes with all necessary ATM drivers and will be manageable from SNMP-based network management systems.

By March 1995, HP will ship the S800 Business Server OC3, a 155Mbps ATM adapter. It will support multimode fiber and Category 5 unshielded twisted-pair wire. No pricing was given.

Both adapters will be made for HP by ATM vendor Fore Systems Inc.

"This is a strong and important first step toward ATM for HP," said Charlie Robbins of the Aberdeen Group, a Boston consultancy. "And they've made a wise move picking Fore as their partner, as the Fore products are proven, off-the-shelf [offerings]."

Beyond implementing the adapter cards, HP's plans are a little less clear.

HP said it's also working on new switching technology that will form the foundation for its line of switching products, including frame switching for Ethernet and 100Mbps Ethernet switching hubs, and cell switching for ATM campus and workgroup switches.

Frame switching products that use ATM will ship in mid-1995, HP officials said. They will be followed by the development of a new class of ATM campus and workgroup switches.

The company said that users who buy the vendor's 100Mbps Ethernet hubs will be able to tap the power of ATM. This will be done by plugging ATM modules into the hubs' expansion slots.

The Palo Alto, Calif.-based vendor said it will demonstrate "in the near future" an ATM router module for its recently released 600 Series router, but did not give details.

HP is at (800) 637-7740.

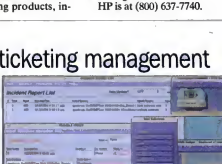
Product Spotlight

Legent extends trouble ticketing management

Legent Corp. by year's end will ship a more versatile version of its Paradigm problem management package. Paradigm/XP 2.10, which will start at $17,500, will offer XPE middleware links to DOS, Windows, OS/2, Unix, and even IBM's host-based MVS, enabling applications written for those environments to gain access to Legent's problem management features.

Paradigm/XP also adds support for Oracle and Informix databases, as well as for Novell Inc.'s UnixWare and Sun Microsystems Inc.'s Solaris 2.0 platforms. The software integrates trouble ticketing, inventory, and notification functions for managing distributed networks. It can consolidate incident reporting by attaching multiple system problems to a single trouble ticket.

Legent, in Herndon, Va., is at (703) 708-3000.



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HP NetServer LM • 90- and 66-MHz Intel Pentium® processor, 66-MHz Intel486™ DX2 processor • Dual Intel Pentium 66-MHz Symmetric Multiprocessing (SMP) • Optional internal hot swap disk array (RAID 0, 1, 5, 6) and ECC memory • HP NetServer Assistant 2.0 included • 16-MB RAM standard, 384-MB maximum • Up to 256-KB write-back cache • 9 mass storage shelves • 8 EISA bus-master I/O slots • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

HP NetServer LF • 66-MHz Intel Pentium processor, 100-MHz IntelDX4 processor, 66-MHz Intel486 DX2 processor • Automatic Server Restart • HP NetServer Assistant 2.0 included • Optional internal hot swap disk array (RAID 0, 1, 5, 6) • 8-MB and 16-MB RAM standard, 192-MB maximum • 256-KB write-back cache • 9 mass storage shelves • 2 PCI, 7 EISA bus-master I/O slots • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

HP NetServer LC • 66-MHz Intel Pentium processor, 100-MHz IntelDX4 processor, 66-MHz Intel486 DX2 processor • Automatic Server Restart • 8-MB and 16-MB RAM standard, 192-MB maximum • Up to 256-KB write-back cache • 1 PCI, 1 PCI/EISA -combo, 4 EISA I/O slots • 5 mass storage shelves • Integrated EISA Fast SCSI-2, IDE and video controllers • Designed-in security, serviceability, and cooling features • Tested and certified on all major network operating systems

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Frye's Windows-based StatRack monitors NetWare LANs

BY VANCE MCCARTHY

ATLANTA — In a move to play a more integrated role in enterprise management, Frye Computer Systems Inc. last week announced at NetWorld+Interop a Windows-based application for NetWare that can monitor and display more than 200 statistics for servers, PCs, printers, and other network-attached devices.

Frye's Statistics Display Rack, or StatRack, also alerts managers when preset performance thresholds are exceeded.

The product is designed to provide NetWare managers with features now unavailable in Novell Inc.'s Monitor NetWare Loadable Module, said Frye president Russell Frye.

StatRack can track dirty cache buffers and provide statistics on pending disk I/Os, as well as on packets and bytes transmitted and received, he added.

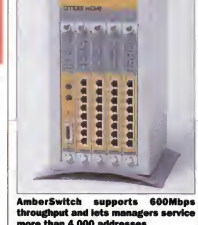
The company plans to roll out Windows products aimed at giving managers applications that are not provided by the major network providers.

StatRack, starting at $295 per server, displays statistics as absolute values or as moving averages. Such polling can be set for each node that is monitored, allowing managers to set more rigorous parameters for more critical nodes.

Key statistics can be displayed graphically while the user is running other Windows applications.

StatRack supports all 200 statistics in NetWare 3.x environments; only 40 statistics are available for NetWare 4.x LANs.

Frye, in Boston, is at (617) 451-5400.



AmberSwitch supports 600Mbps throughput and lets managers service more than 4,000 addresses.

Amber's low-cost LAN switch offers expandability

ATLANTA — Start-up Amber Wave Systems Inc. launched at NetWorld+Interop last week a low-cost LAN switching platform designed especially for cost-conscious managers with small but growing workgroups.

With an entry price of $1,995, the base model AmberSwitch 10Mbps Ethernet Switch comes with eight ports, expandable to 32 ports. The unit has a five-slot chassis, works with 10Base-T, and will support 100Base-T Ethernet when multiport add-in cards ship in 1995.

The AmberSwitch bus architecture is capable of sustaining 600Mbps (or 700,000 packets per second) of throughput, and it allows managers to service more than 4,000 active network addresses for PCs, printers, peripherals, and other network-attached devices, officials said

AmberSwitch is bundled with several software agents to improve network efficiency. An IEEE 802.1D Spanning Tree algorithm monitors network traffic to ensure that LAN data is transmitted over the most efficient network path available.

AmberSwitch is also manageable via all SNMP management platforms, and it has a default auto-configuration using BootP and TFTP (Trivial File Transfer Protocol), the standard TCP/IP broadcast mechanism and download protocols, respectively.

Amber Wave Systems, in Acton, Mass., is at (508) 266-2852.

— Vance McCarthy

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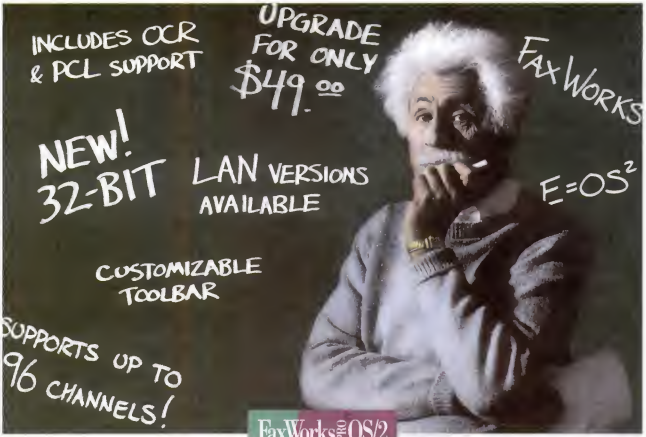

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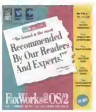

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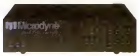

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From the Editor / Ed Foster

Survey says companies moving to client/server to boost profits

It looks as if downsizing has been overrated.

Of all the things we've learned from the *InfoWorld* 100, that's what struck me most clearly as I looked through the returns from our survey. There has been a tendency in the industry at large to think of client/server as synonymous with downsizing legacy applications from the mainframe. But the *InfoWorld* 100 has made it clear to me that's not what's happening.

Sure, a lot of people are moving to a client/server architecture to reduce or eliminate their use of big iron. As you'll see beginning on page 59, quite a few of the *InfoWorld* 100 organizations cite that as a major motivating factor for their projects.

On page 70 though, you'll notice a couple of tables showing how much of the client/server budgets for *InfoWorld* 100 participants is going to converting legacy applications and how much to new application development. Overwhelmingly, the money is going to new applications, a trend that's slightly more pronounced within the Top 10.

That's what the numbers indicate. And in looking over the actual descriptions of the *InfoWorld* 100's client/server projects from their applications, I realized that the story goes beyond the numbers. Client/server technology, the *InfoWorld* 100 members say, lets people do things and gives them competitive abilities they haven't had before.

It would be nice if I could share all their comments with you. Unfortunately, even with all the pages we're dedicating this week to the results of the *InfoWorld* 100 study, we can only skim the surface. But relaying a few of the applicants' descriptions of their project goals and benefits might help.

"We wanted to control the entire pricing system of seven regional offices with 16 managers ... and the ability to run the entire operation from any of the offices," said one *InfoWorld* 100 participant whose project helped the company increase revenues more than 100 percent with greater managerial access to its remote sites.

"The scope of the project involves our whole company, as well as our customers," said another who also attributes a sharp increase in profits to the use of client/server technology. "We had different departments with different islands of information, and we wanted to access this from a network. The project integrates manufacturing, inventory control, accounting, distribution, etc. in our network."

"We improved productivity time to order parts, functionality of labor time, and the ability to identify retrieval of warranty cost claims," another said.

"Our goal was to better understand sales and financial information in our company ... it has given us much better knowledge of our projects and customer bases."

"We wanted to rebuild the infrastructure."

"Our goal was to provide management with day-to-day information about process, cut down on paperwork, and reduce telephone costs."

"We wanted to integrate the information we have and make it more meaningful."

"We're able to offer effective information that has not been offered in the past."

I could go on, but I think you get the idea. Even those applicants who did not make the final cut to be in the *InfoWorld* 100 reflected the same attitude. Time and again, the basic refrain that came through was that these IS managers are excited to have discovered the ways client/server technology empowers them and their companies.

It's not that downsizing of legacy applications isn't taking place. It is. As you read the profiles of the Top 10, you'll see that a number of them have succeeded dramatically in moving major mission-critical applications off the mainframe. Even in those cases, though, it's not just a matter of being able to run the same old application on a more cost-effective platform. In moving to a distributed environment with GUI front ends and access to diverse databases across the network, even downsized applications are so totally reinvented that they seem brand-new.

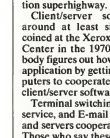
That's why I say downsizing is overrated. Whether a new client/server application replaces a legacy system is ultimately not the issue. The real point of client/server technology is helping people design new ways to make their organizations more productive and competitive.

And I'm grateful to all those who participated in the *InfoWorld* 100 for helping bring that lesson home. I'm looking forward to the lessons you — even if you didn't participate this year — will teach us next time.

Ed Foster is editor of InfoWorld. *He gets E-mail at MCI account 584-3453; or call (800) 227-8365, ext. 710, to report a gripe you have with a vendor.*

From the Ether / Bob Metcalfe

Here's how to take client/server software for a spin on the Iway



This week's issue of *InfoWorld* celebrates the aggressive use of client/server software in information systems. On this happy occasion, I won't be snide. I'll join the celebration with these thoughts about the future of client/server software on the information superhighway.

Client/server software has been around at least since the term was coined at the Xerox Palo Alto Research Center in the 1970s. Whenever somebody figures out how to advance a major application by getting two or more computers to cooperate through a network, client/server software is reinvented.

Terminal switching, laser printing, file service, and E-mail routinely use clients and servers cooperating through LANs. Those who say these are not true clients and servers are often snide columnists past their deadlines or impostor inventors with bogus patents — the 1987 Billings client/server patent (#4,714,989) is at last under re-examination and will soon be invalidated, I'm sure.

The current client/server craze is about SQL database servers and their GUI clients. Experience is accumulating and success stories are no longer rare. But still, client/server database applications are no slam dunk, and this is especially true when going beyond the LAN.

After presenting a five-year plan for moving her company's brokerage transactions off a mainframe onto a nationwide client/server network of workstations and servers, one CIO, Dawn Lepore, executive vice president of Charles Schwab & Co. Inc., said she feels like a quarterback throwing a long pass to a receiver who hasn't been born yet — and who might not choose football. She was, of course, referring to the reliability, performance, and security problems of TCP/IP internetworking.

We don't often hear about client/server on the Iway. This worries me. Is the Iway so big we can afford to relearn the lessons of client/server? Or are certain Iwaymen afraid that client/server thinking may lead to an open and competitive Iway?

Complicating the situation are six different, albeit converging, conceptions of the Iway: corporate information systems; digital television; video telephone; bulletin board systems; on-line services; and the Internet.

We have to start thinking of digital TV set-top boxes as clients and of cable TV head ends as servers. My bet is that useful set-top clients will have the power of today's $2,000 personal computers — for $200. Head-end servers should be open application platforms, not just specialized video pumps. And we should be sure that digital TV systems connect anyone's servers, not just those owned by TV companies.

Video telephone will turn out to be mostly peer to peer — data and video conferencing among personal computer users. But, as with digital TV head ends, video telephone central offices should be open application servers, and they should connect non-telco servers.

In addition to going beyond the LAN, another major new client/server requirement is multimedia. Client/server is currently based almost exclusively on LAN packets. Packets, we're told, are not great for multimedia — they're long and uncertainly routed. We must make the transition from LAN packets to WAN cells, which are short with precomputed routes.

To fully exploit Asynchronous Transfer Mode (ATM) cells, we'll eventually need new cell-based components: transmission systems, internal PC buses, network protocols, operating systems — even new cell-based client/server applications. We'll be working on this for another 18.5 years. (See "The future of LANs," May 24, 1993, page 67.) Notice how hard ATM proponents are working today just on emulating packets with cells — an easier but less fulfilling job than getting everything "cellified."

Our lesson of client/server software is the importance of open protocols and APIs. For laser printing, it was the emergence of PostScript that really got things going. For database servers, it was SQL. For BBSes, the Remote Imaging Protocol and its language, RIPscript, are building momentum.

We should be debating various new client/server "scripts" for digital television and video telephone just in case their suppliers aren't yet thinking of open access. This month, on-line services are getting General Magic's Telescript, slated to appear first in AT&T's PersonaLink. Telescript promises to take client/server objects onto the commercial on-line services Iway.

Meanwhile, best wishes to the *InfoWorld* 100.

InfoWorld publisher Bob Metcalfe invented Ethernet in 1973 and founded 3Com Corp. in 1979. He receives E-mail via the Internet at bob_metcalfe@infoworld.com.

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TO THE EDITOR

A call for OS/2 compatibility

After reading [IBM spokesman] Bill Robins' statement that OS/2 and Chicago compatibility is a "non-issue," (see "IBM to launch OS/2 upgrade," Sept. 5, page 10), I am forced to comment. I am an IS manager preparing to change my company's infrastructure. Because of business plans, I must decide prior to Chicago's release date. My company is a regional representative for 13 different manufacturers. We must remain compatible with our manufacturers, as well as our customers.

Even though I am leaning toward OS/2 as a desktop choice, other companies are not. One of our manufacturers will use Chicago. This company represents 45 percent of our business, so it would be prudent to remain compatible with them.

IBM should pull its head out of the sand — it, or any other software vendor (including Microsoft), can no longer produce software in a vacuum. With today's issues, cross-platform and cross-product compatibility are always an issue. Statements such as Robins' lead me to believe I should choose the Windows platform and forget about OS/2 because of future compatibility issues.

If the perceived risk of OS/2 were lessened by better compatibility, sales would increase. IBM should concentrate more on the customer and less on the rivalry.

Philip J. Ehrmann
Louisville, Colo.

Benchmarks: solitary concern

At last! A real-life use has been found for the ubiquitous Windows Solitaire (the shuffling is so bad, one can't tolerate it as a game!). Well, perhaps. (See Peer to Peer, Sept. 5, page 52.) I realize Scott Greiff recommends the Solmark Index with tongue firmly in cheek, but it should be pointed out that because the direction in which each card flies off the stack is random, you won't get the same result each time you run Solmark, even on the same machine.

Results on slower machines can vary as much as 20 percent or more. I'm afraid we'll have to keep searching for the "perfect" Windows benchmark.

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Review misses graphics 'look'

In Alan Fridlund's otherwise detailed and comprehensive review of presentation software (see product comparison, Sept. 5, page 65), there was no consideration given to the quality and attractiveness of the programs' appearance when in use. This omission is surprising given the importance of image in the business of persuasion, which, presumably, is the goal of most presentations.

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If it don't work...

Stewart Alsop raises my hackles because I keep wondering, "Why do he — and others — keep using software and hardware that does not work?!" (See Distributed Thinking, Aug. 29, page 106.) Would you continue to use a photocopier if it only sometimes copied a page? Would you keep your telephone if it rang only occasionally? Would you keep a television if it shut itself off at random intervals?

I can think of many possible answers for why you might have the desire to break the "if it don't work, send it back" rule — but don't. That $85 sound card might look like a deal (until you spend 6 hours attempting to install it).

I can also vouch for my success at avoiding these problems. Year to date, I have spent 2 hours troubleshooting hardware/software issues (excluding beta test time) on seven computers at home and work. I have sound, SCSI, CD-ROMs, DAT drives, and every possible goody that one could want.

> **"IBM should concentrate more on the customer and less on the rivalry."**
>
> *Philip J. Ehrmann*

I do spend slightly more than others on PCs though — more than $600 per comparable machine. My machines average one reboot every 278 working hours, most caused by installation of new beta software, which requires a reboot. Get this: Even my laptop can be unplugged from a 10Base-T network without a hitch. I simply pull the dongle out of the adapter and walk away. If I want to move to a different office, I unplug the 10Base-T connection and walk to another office to "plug in." No reboot required.

So in answer to Alsop's question, "I wonder if I am the only person who has acquired the only two problematic computers available?" — *No.* My question: Why do you put up with the problems?

Stephen Purpura
Systems Design Group
Pittsburgh

Of barometers and buildings

Nicholas Petreley and the E-team missed the obvious answer to the barometer problem. (See Down to the Wire, Aug. 29, page 66.)

1. Take a barometric reading at the top of the building.
2. Chuck the barometer over the side.
3. Time the delay between the release of the barometer and the subsequent smashing of the barometer.
4. Use A=9.8m/sec^2 to calculate the height of the building.
5. Discard barometric reading.

John Yasaki
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More tips please, Brian

After enjoying years of great tips from Brian Livingston on how to better leverage our investment in Windows technology, he has apparently "hit the wall." This was my favorite column in *InfoWorld* (and hopefully will be in the future — Brian, are you listening?). It all started this March with a multicolumn diatribe against CompuServe's heavy-handed tactics. (See Window Manager, March 7, page 25; March 28, page 30; and April 4, page 26.)

After that it got much worse: Lately, we were treated to a long series of columns on the Black Screen of Death. (See Window Manager, May 16, page 28; May 30, page 29; and June 6, page 30.) This topic probably warranted one paragraph of space.

Most recently, three full weeks were dedicated to the legal standing of the word "uninstall"! (See Window Manager, Aug. 15 and 22, page 26, and Aug. 29, page 31.)

I have great respect for Brian and a great desire for him to get back to the basics of helping those of us in the trenches be more productive.

Rosalie Johnson
Fargo, N.D.

Applel Make better tools

I've taken an interest in the death-of-the-Macintosh discussions. (See To the Editor, Aug. 15, page 47, and Aug. page 45; Distributed Thinking, Aug. 8, page 98, and July 11, page 110.)

Apple or the Macintosh community must provide better programming tools with flexibility, near-to-metal speed, and ease of use typical of Visual Basic. HyperCard or SuperCard still do not provide these capacities. The Mac OS is still superior but the issue with GUI is judging a book by its cover.

As the medical community gears for a massive influx of PCs to be used for an electronic record system, who are we going to invest in? Which market provides us with a base from which to draw people and material to perform this huge task?

Is the high-speed PowerPC providing solutions that have yet to be fully exploited on lowly 486s or 386s? Is the speed offered by the PowerPC cost-effective for most user applications rather than a graphics and video niche market?

Apple never properly capitalized on its edge. Its technological leaps are fine for single-user systems, but massive investment in legacy systems makes application migration important.

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Client/server payoff

Innovative projects go to the bottom line

BY DEBORAH ASBRAND

Client/server and innovation — there used to be something slightly incongruous sounding about the two terms together. After all, successfully implementing a client/server technology strategy is considered by many to be akin to climbing Mount Everest. Just doing it is enough of a feat. Does there have to be something innovative about it, too?

For the companies in the *InfoWorld* 100, the answer is yes. For them, client/server is more than just the latest fancy technological fad. It's a down-to-earth business solution.

That's a far cry from the everyone's-talking-about-it-but-no-one-is-doing-it rap that has dogged the client/server architecture for a long time. Important supporting technologies like networking have matured, allowing distributed computing to take its place in the corporation. Sensing that, *InfoWorld* interviewed hundreds of businesses about their client/server applications. The result is the *InfoWorld* 100, the most innovative client/server companies in the nation.

The *InfoWorld* 100 recognizes innovation on many levels. All of the companies had to display the spirit of innovation throughout their businesses. They had to recognize its value to operations, sales and marketing, financial processes, human resources, and management. It had to be part of the fabric of the company. Pockets of innovation, no matter how impressive, were ruled out.

Based on lists supplied by *InfoWorld*, research company Trish Associates of Santa Clara, Calif., conducted a 44-question survey to identify client/server projects that represented the freshest and most challenging applications. From nearly 500 companies that were considered, we chose the 100 most innovative.

Be prepared to be inspired: Gone are the days when distributed computing was considered a tool to boost efficiency among the deskbound corporate set. Today's client/server computing is helping maintenance employees at American Airlines (#56) in Dallas/Fort Worth and Tulsa order parts right from the hangar. It's also soaping up automobiles for car-wash company Syrinx Systems (#95). And at Veka Inc.'s (#38) factory in Fombell, Penn., it's powering 12 robots that feed raw materials into machinery.

FORWARD THINKING. Such ingenuity is the mark of forward-thinking companies, says Hugh Ryan, director for new age architecture for Andersen Consulting. The first companies to go to client/server "were on the leading edge and taking on significant risk in terms of the learning curves, lack of certainty of the technology, and lack of understanding of where the problems were. They were going to client/server because they thought they needed it to solve a problem."

Indeed, *InfoWorld* 100 companies are changemakers. Eighty-two percent of the companies have their projects in production. Given the ubiquity of the term "reengineering" in pop business-speak, many of the companies wince at using the phrase to describe their activities, but in fact that's what many have done. Take CCH Legal Information Services (#8), a legal services provider in New York. Finding in 1990 that its competitors had gotten the best of it, the company remade itself. It hired the necessary software development talent to create an on-line package for its customers, phased out its mainframe, and cast aside its hierarchical view of business in favor of a newer, leaner team approach. Its reward? The double bonus of new revenues from its popular software products and million-dollar savings from its conversion to distributed computing.

That kind of success has inspired enough attention in client/server technology to take it from esoteric curiosity to

See INFOWORLD 100, page 66

Motorola vice president William Connor

Top 10 companies

1. Motorola Inc.'s General System Sector *(see page 76)*
2. MCI Communications Corp. *(see page 77)*
3. Market Vision *(see page 80)*
4. National Hospital and Health Care Services *(see page 81)*
5. Everett School District *(see page 82)*
6. Arizona Motor Vehicles Division *(see page 88)*
7. Standard Commercial Corp. *(see page 89)*
8. CCH Legal Information Services *(see page 92)*
9. RMS Associates *(see page 93)*
10. Office of Assistant Secretary of Defense *(see page 96)*

Inside

Client/server payoff: the top 100

Ranking	Company / Location	Points: Total	Client/server strategy	Use of technology	Client/server implementation	General business information: Business type	Number of employees	Number of locations	Technology snapshot: Number of client/server projects	Number of PCs	Number of operating systems in use	Size of IT staff	Number of client machines in project	Number of server machines in project
1	**Motorola Inc.'s General Services Sector** Tempe, AZ *Profile on page 76*	1000	292	66	642	Cellular phones, Computers	100,000	500	30	80,000	2	875	10,000	1,000
2	**MCI Communications Corp.** Arlington, VA *Profile on page 77*	905	207	67	631	Telecommunications	36,000	160	NA	40,000	2	45	11,000	250
3	**Market Vision** New York, NY *Profile on page 80*	882	146	172	564	Financial services	100	5	12	120	6	30	1,000	25
4	**National Hospital and Health Care Services** Rosemont, IL *Profile on page 81*	825	418	53	354	Insurance	54	1	12	45	2	3	50	1
5	**Everett School District** Everett, WA *Profile on page 82*	809	223	63	523	Education	1,500	27	27	2,000	3	5	3,000	30
6	**Arizona Motor Vehicles Division** Phoenix, AZ *Profile on page 88*	799	179	62	558	State government	1,300	75	3	3,000	2	150	1,000	100
7	**Standard Commercial Corp.** Wilson, NC *Profile on page 89*	795	348	17	430	Tobacco, wool	3,500	45	40	330	3	20	110	10
8	**CCH Legal Information Services** New York, NY *Profile on page 92*	749	173	18	558	Legal services	5,000	6	1	1,000	4	11	800	25
9	**RMS Associates** Linthicum Heights, MD *Profile on page 93*	741	201	101	439	Data processing services	120	1	10	120	3	40	1,300	4
10	**Office of Assistant Secretary of Defense** Washington, D.C. *Profile on page 96*	738	194	102	442	Military	150	3	8	200	3	8	150	8

Trends from the top 10

Average number of servers that the highlighted project is running on: **145**

Average number of users project is accessible to: **3,493**

Average number of client machines that the highlighted project is accessible to: **2,841**

Average number of locations where the project is accessible: **47**

Average number of projects underway: **16**

Average percent of IT spending that is for client/ server: **73.5**

Number of projects planned in 1–6 months: **4**

Number planned in 7–12 months: **1**

Number planned in 13–18 months: **2**

Number planned in 19–24 months: **1**

Number planned in more than 24 months: **2**

Projects with expected payback time of 1–6 months: **3**

Projects with expected payback time of 7–12 months: **1**

Projects with expected payback time of 13–18 months: **1**

Projects with expected payback time of 19-24 months: **1**

Projects with expected payback time of more than 24 months: **1**

Average percent of client/server spending to convert legacy applications: **35.5**

Average percent of client/server spending for new applications: **64.5**

Tables and graphs designed by Lisa Ferdmandsen of Power Productions

Specifics about the highlighted project

	Description	Business benefit	Applications implemented	Primary application	Key technologies on client side	Key technologies on server side	Key tools that made it possible
1	Moved all computing used for every aspect of a manufacturing business off of the mainframe to a Unix-based system running X terminals	Dramatically reduced costs	E-mail, network management, database, project management, document management, transaction processing, accounting/financial, office productivity	Transaction processing	4th generation, Oracle, and Informix products	Database engines	Informix 4GL
2	MCI built its Friends & Family calling service on an OS/2-based client/server system, which became the foundation for the company's customer-service operation—this fall, it will convert its entire telemarketing operation to NT-based client/server	By building speed, accuracy, and agility into its client/server implementation, MCI has increased revenue by selling out critical applications to front-line workers and tying the rest of corporate to the same information	E-mail, network management, database, document management, transaction processing, workflow application, accounting/financial, office productivity	Transaction processing	Windows NT, Visual Basic, OS/2, Microsoft C, IBM C, IBM SOM libraries	OS/2 1.3, OS/2 2.1, Windows NT	KnowledgeWare ADW, Visual Basic, Microsoft C
3	Data distribution system that provides real-time information to the financial community	More desktop control for users, hardware cost savings, tremendous flexibility for configuring small, medium, and large data distribution networks	Data distribution	Data distribution system	X11 Open Look, Motif, Windows, DDE, OLE	Windows NTAS, Sun OS, Sun Solaris, HP/UX, IBM AIX, TCP/IP routing, SNMP network agents, fault-tolerant applications	Code Center, Purify, UIMX
4	Creation and maintenance of a DOS-based client/server network supporting distributed client/server applications	Low cost, high performance	Quoting/prospecting system, sales tracking system, calendar, project control, others	All	The Creator, cc:Mail	cc:Mail WAN E-mail gateway	None
5	Inter-campus information system encompassing 27 schools	Better student learning, more efficient administration	Word processing, E-mail, educational curriculum software, resource scheduling	E-mail, resource scheduling	Crossplatform application software, Internet access via TCP/IP stack	NetWare 4, Miramar Personal MACLAN	None
6	Reengineering of three essential processes for the Motor Vehicles Department, with subsequent creation of new client/server applications	Cost benefit of $50 million annually	Drivers license, vehicle registration, motor carrier registration/taxation systems	All	Compaq workstations, OS/2	IBM LANServer, IBM DB2, XDB	KnowledgeWare's ADW, Intersolv APS, Micro Focus Development Workbench
7	Replaced an aging IBM mainframe with LAN-based PCs running client/server applications	Significant maintenance savings expected over the long term	Order entry, purchasing, inventory, quality control, shipping, invoicing	All	PowerBuilder	Sybase SQL Server	PowerBuilder, Visual Basic, Microsoft C
8	Created commercial software for customers and then used parts of the product for downsizing internal system. By the end of the year, will have moved on-line transaction processing and DB2 database applications off the mainframe to an RS/6000 AIX system	Greater customer satisfaction and $5 million reduction in operational expenses	E-mail, database, project management, office productivity, custom sales system	Custom sales system	TCP/IP, many custom software packages	RS/6000, MDI Gateway	Microsoft C
9	Replace NASA mainframe bibliographical search application and daily business applications with Unix servers and PCs	In the short term, simpler access to information—in the long term, take advantage of emerging technologies such as full text retrieval and video	Bibliographic database, business applications	Database	PCs with Windows	Unix, NetWare	XVT
10	Replace proprietary computers with PCs and LANs for military analysis applications	Provide military leaders with simpler and more timely access to data	E-mail, database, document management, workflow applications, executive information system	Executive information system	PCs with Windows	Arbor Essbase, Pilot Lightship, Lotus Notes	Arbor Software's Essbase, Pilot Lightship

On the client/server trail

We know you're out there performing acts of innovation with client/server technology. You just can't talk about it. Maybe your company considers technology deployment a competitive advantage or maybe your bosses haven't broken the news to the mainframe provider that its services will no longer be required once the enterprisewide client/server project is fully implemented. Whatever the reason, some companies are reluctant to let information about client/server use outside of the building. Indeed, the known technology leaders like Procter & Gamble, or arch rivals Coca-Cola and Pepsico, are no doubt client/server pioneers. Just don't ask them for details. In the financial services sector, we're positive that companies such as Merrill Lynch and Goldman Sachs are rapidly deploying client/server projects but are too shy to talk about them publicly. Sometimes, an organization's sheer size is the problem. From tiny Delaware to mammoth California, state and local agencies are running both pilot and production projects, but getting approval to disclose the details can require a bureaucratic tango that results in lots of exercise but goes nowhere. If your company or agency should be considered for next year's *InfoWorld* 100 list, we'd like to hear from you now so we can start oiling the wheels of information. We don't deal in anonymity but can guarantee not to divulge specific details about your use of client/server without verifying them. The first step is to fill out the form on page 65 and fax it back to us.

Methodology

The *InfoWorld* 100 companies were chosen from 181 projects analyzed during April and May 1994 by Trish Associates, a Santa Clara, Calif., research firm. The 181 were chosen from nearly 500 companies that we considered based on their profile in the *InfoWorld* subscriber database or that replied to a published request for information about use of client/server technology. We chose the 100 most innovative companies by analyzing the survey results in three major categories: 1) overall client/server strategy, 2) technology use in general, and 3) implementation of client/server technology through a single project, chosen by the company as its most important project. Client/server strategy includes factors such as the total number of client/server projects in a company and the ratio between overall IT spending per employee and IT spending for client/server projects. Technology use includes factors such as PCs per employee, size of IT staff, and IT spending as a percentage of total revenue. The third factor, client/server implementation, centers on the highlighted project, and includes variables such as the number of users, client machines, and servers employed in the project. This factor was also weighted depending on the type of enterprise. General businesses received the highest weighting while universities received a lower weighting. Companies that declined to disclose detailed information about their overall use of technology or specific client/server implementations lost points. Companies that agreed to cooperate only anonymously were dropped. The final rankings were adapted to a scale in which 1,000 is the highest score.

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vendors who claim their client/server tools are better than PowerBuilder Enterprise

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Ranking		Points				General business information		
Rank	Company name/location	Total points	Client/server strategy	Use of technology	Client/server implementation	Type of business	Number of employees	Highlighted project
11	GTE Data Services/Temple Terrace, FL	737	178	37	522	DP services	90,000	Software development and distribution system
12	First Chicago/Chicago, IL	729	151	33	545	Banking	15,000	Account executives in 80 locations set up and process loans
13	Wharton School/Philadelphia, PA	729	254	90	385	Education	600	Migration of all faculty research off VAX system to distributed servers
14	Capitol Records/New York, NY	721	219	61	441	Music, CDs, tapes	6,000	Worldwide tracking of business, including artist royalties
15	University of South Carolina/Columbia, SC	681	146	51	484	Education	11,000	Applications accessible to all faculty and staff
16	Universal Electronic Inc./Twinsburg, OH	678	194	54	430	Remote controls	475	Customer support for universal remote control device
17	Martin County/Stuart, FL	652	253	14	385	County government	700	A geographic information system to digitize county maps
18	The PMA Group/Philadelphia, PA	640	85	75	480	Insurance	1,200	Reporting system for the underwriting areas at all locations
19	New York State OCJS/Albany, NY	637	18	74	545	State government	900	Court disposition information accessible to state employees
20	Bay Medical Center/Panama City, FL	630	129	10	491	Health care	1,500	Current patient information for doctors, nurses, administrators
21	Ryder Trucking/Miami, FL	627	10	52	565	Transportation	10,000	Links all employees in 87 locations in the United States
22	John Hancock Place/Boston, MA	627	196	42	389	Insurance, financial	12,000	Consolidate and centralize all applications development
23	Blue Cross/Blue Shield Association/Chicago, IL	627	10	33	584	Insurance	100,000	Projects in imaging department and customer service
24	Georgetown University Medical Center/Wash., D.C.	615	127	56	432	Health care, education	200	Patient research database to study infant mortality, high-risk pregnancies
25	Geisinger Medical Center/Danville, PA	614	13	15	586	Health care	7,000	A clinical information system allowing graphical display
26	KBLCOM/San Antonio, TX	604	15	29	560	Cable TV	1,000	Moving mainframe billing system for better employee access
27	Univ. of Rochester Medical Center/Rochester, NY	604	27	67	510	Health care, education	1,500	Accounting for the medical center and school
28	Solvay Polymers Inc./Houston, TX	600	52	42	506	Plastics	700	Replacing financial, sales and marketing, materials management system
29	UCLA Medical Center/Los Angeles, CA	597	80	24	493	Health care, education	3,000	A paging application for the entire medical center
30	Consolidated Edison/New York, NY	595	197	141	257	Utilities	17,000	Replaces 25-year-old manual system to manage work orders
31	Stanford Telecom/Lanham Seabrook, MD	595	112	129	354	Telecommunications	3,000	Configuration management system
32	Air Products & Chemicals Inc./Allentown, PA	594	99	33	462	Industrial gas, chemicals	15,000	Manages the process of order entry
33	Smith Kline Beecham/King of Prussia, PA	594	98	14	482	Pharmaceuticals	50,000	Tracks test results at sites in the United States and United Kingdom
34	State of Utah, Div. of Finance/Salt Lake City, UT	592	86	31	475	State government	18,000	Replaces the state's entire financial and accounting system
35	Elsevier Scientific Inc./Tarrytown, NY	592	58	48	486	Publishing	1,000	Provide central location with access to information at production facility
36	University of Arizona/Tucson, AZ	591	10	58	523	Education	12,000	University-wide access to Internet
37	Norstan Communications Inc./Maple Grove, MN	580	83	24	473	Telephone sales, service	1,800	Sales force automation
38	Veka Inc./Fombell, PA	578	126	22	430	Extrusions	300	Integrate manufacturing, inventory control, accounting, distribution
39	MEMC Electronics Material Co./St. Peters, MO	578	50	12	516	Silicon	6,000	Customer order management and plant scheduling system
40	Miami Dade Water & Sewer/Miami, FL	572	103	15	454	Water, utilities	2,000	Decision support system for engineers and senior management
41	Chevy Chase Bank/Chevy Chase, MD	570	14	55	501	Banking	2,200	Mortgage loan originator and approval process
42	Vastar Resources Inc./Dallas, TX	569	10	86	473	Energy distribution	265	Gas market account system used at six locations
43	Arco Chemical/Newton Square, PA	563	20	52	491	Chemicals	5,000	Sales information system
44	State of Wyoming, Dept. of Health/Cheyenne, WY	562	107	29	426	State government	1,700	Health care needs-assessment, health care delivery
45	First Trust/Minneapolis, MN	561	10	17	534	Financial	11,000	Quote and market data service throughout bank
46	Daytons/Minneapolis, MN	561	58	10	493	Retail	100,000	Camman set of productivity applications at all retail sites
47	Jackson Hewitt Tax Services/Virginia Beach, VA	561	10	69	482	Tax services	900	Provide information from a database to 450 employees
48	Baxter Diagnostics Inc./Miami, FL	554	99	20	435	Health care products	3,000	Quality control (failure analysis) system for five divisions
49	SUNY Computer Services/Niagra Falls, NY	554	24	78	452	Education	1,300	Student financial records accessible to faculty
50	J. R. Simplot Co./Boise, ID	541	80	65	396	Agribusiness	9,000	Warehouse management systems for several warehouses
51	Federal Reserve Board/Washington, D.C.	537	160	99	278	Federal government	2,000	Data collection and tracking system for the Home Mortgage Disclosure Act
52	The Associates/Irving, TX	537	29	41	467	Consumer loans	10,000	Forms automation program for roadside assistance program
53	Rockwell International/Houston, TX	537	35	31	471	Aerospace	10,000	Document management system
54	DMB & B/New York, NY	537	10	24	503	Advertising	5,000	Time entry of employees in two states
55	U.S. Army/Natick, MA	528	10	53	465	Federal government	11,000	E-mail at one location
56	American Airlines/DFW Airport, TX	523	61	10	452	Transportation	119,000	Parts ordering system for maintenance aircraft employees
57	DHHS PHS ORHA/Atlanta, GA	523	89	38	396	State government	500	Access to information on health clinics in the Southeast
58	Blue Cross/Blue Shield of Rochester/Rochester, NY	523	10	68	445	Insurance	1,000	Quick access to data for the customer service department
59	Nabisco Foods Group/Parsippany, NJ	519	29	10	480	Foods	30,000	An executive information system, used throughout organization
60	Town of Bamstable/Bamstable, MA	515	112	10	393	Local government	1,200	The town is replacing mainframe system
61	General Council of the Assemblies of God/Springfield, MO	509	58	21	430	Non-profit	1,020	Tracks assignments, addresses and contacts of missionaries
62	Connecticut Mutual Life/Hartford, CT	505	50	42	413	Insurance	4,600	Support for new business and underwriting
63	Combined Insurance Co./Chicago, IL	505	17	23	465	Insurance	40,000	Project in the marketing departments in U.S. and Canada
64	Alaska Department of Fish and Game/Juneau, AK	500	24	65	411	State government	30	Manages salmon fisheries for the state's 50 fisheries
65	Siecor Corporation/Hickory, NC	500	38	49	413	Fiber-optic cable	3,000	Invoicing information stored as data, replacing microfiche system

Despite all the fine talk about client-server computing environments, the bottom line is, there's a massive amount of critical data residing on desktops scattered throughout your company.

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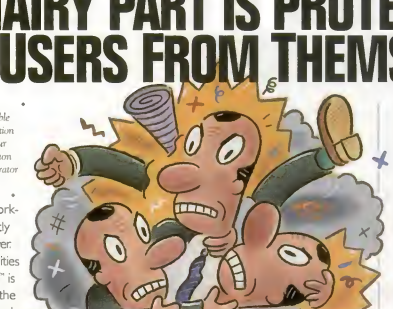
For even more efficiency, Norton Utilities Administrator keeps track of your workstations' histories and lets you proactively handle routine maintenance. It ensures that all your workstations are operating at peak performance, preventing downtime and the risk of data loss. So your entire network will operate at maximum efficiency.

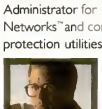
Now you really can protect your users' data. Without having to worry about your users protecting themselves.

A 1992 study by IntelliQuest shows one in every four intensive PC users will experience a significant data loss – costing between $10,000 and $100,000 per incident. Care to let your users take a gamble?

PROTECTING USERS' DATA IS EASY. THE HAIRY PART IS PROTECTING YOUR USERS FROM THEMSELVES.

Are you comfortable leaving data protection in the hands of your users? If not, Norton Utilities Administrator is the solution.





Peter Norton pioneered desktop data protection. Now we're extending our expertise across your enterprise with Norton Utilities Administrator.

system files are stored on your server for easy crash recovery.

Best of all, every single workstation on your network is actively being watched over. Kinda like a protective big brother.

In the interest of data integrity, our new Norton Disk Doctor Network Agent™ performs a battery of tests on each workstation's hard disk and data structures. This important step happens the instant users log-on to the network.

You can now diagnose and repair the

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Ask for Extension 9E48 and request our White Paper: Reducing Network Administration Costs With Remote Workstation Recovery Tools.

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Ranking		Points				General business information		
Rank	Company name/location	Total points	Client/server strategy	Use of technology	Client/server implementation	Type of business	Number of employees	Highlighted project
56	Zales Corp./Irving, TX	499	10	72	417	Retail	800	General ledger application for headquarters
57	Monsanto/St. Louis, MO	499	27	35	437	Chemicals	32,000	A data warehouse for sales, marketing, logistics, finance
58	University of Wisconsin/Madison, WI	496	10	65	421	Education	1,000	Library system accessible in libraries and student PC labs
59	Pershing/Jersey City, NJ	494	12	41	441	Finance	1,000	Productivity package for traders
70	L & F Products/Highland Hills, NY	490	10	13	467	Consumer products	5,000	Replacing mainframe sales history system
71	Brown University/Providence, RI	489	11	80	398	Education	1,700	Tracks students demographics, records, courses, classrooms
72	Commonwealth of Kentucky/Frankfort, KY	486	10	29	447	State government	33,000	Tracks full-time and contract lawyers for the public defender's office
73	Time Publishing Co./St. Petersburg, FL	486	15	24	447	Publishing	2,500	Customer service circulation system for newspaper
74	Baptist Medical Systems/Little Rock, AR	482	10	10	462	Health care	5,000	Access to medical records for more than 100 doctors
75	Johnson Controls Inc./Milwaukee, WI	482	10	10	462	Auto batteries	45,000	Tracks cost and activity at 13 division sites
76	Allied Signal/Tempe, AZ	463	37	14	412	Aircraft components	60,000	Multimedia electronic work instructions for mechanics
77	Coldwell Banker/Mission Viejo, CA	462	10	10	442	Real estate	50,000	Central data bank for all office locations
78	University of Arkansas/Fayetteville, AR	455	15	107	333	Education	2,500	Increased access to data for administrative and faculty use
79	North Carolina State University/Raleigh, NC	454	38	33	383	Education	5,000	Internet-based delivery of data and images
80	Tennessee Treasury Department/Nashville, TN	453	13	47	393	State government	170	Converting from mini/mainframe at three locations
81	Blue Cross/Blue Shield/Louisville, KY	453	49	30	374	Insurance	11,000	Health-risk analysis system for employers to share with employees
82	New York State Insurance Fund/Albany, NY	452	15	44	393	Insurance	2,500	Applications to increase production in the claims department
83	Von Tran/Santa Ana, CA	451	51	33	367	Transportation	10,000	Ensures compliance with American with Disabilities Act
84	Reliance Motion Control/Eden Prairie, MN	449	130	34	285	Motors	175	Data repository from manufacturing that is distributed to management
85	New York State OMH/Albany, NY	448	10	10	428	State government	32,000	A state-wide human resources system
86	Amoco Chemical/Chicago, IL	438	32	21	385	Chemicals	20,000	Distribution of software and network tools, database management
87	Sallie Mae/Herndon, VA	434	100	44	290	Financial	4,300	Nationwide loan origination and disbursement system for medical students
88	Federal Reserve Bank/Salt Lake City, UT	434	10	31	393	Federal government	2,300	A financial services information system
89	Vought Aircraft Co./Dallas, TX	429	25	45	359	Aircraft	5,500	Processes and manages the building of parts
90	Bankers Trust Co./Jersey City, NJ	428	91	34	303	Financial	12,000	Customer response line for 401k information
91	Parkway/Bridgewater, NJ	427	77	47	303	Auto insurance	60	Forms automation program
92	American Custom Insurance Services/Los Angeles, CA	426	31	60	335	Insurance	84	A submission policy processing system
93	Sherwin Williams/Chicago, IL	426	10	10	406	Paint	17,000	Re-do paint formula development process
94	Murphy Oil USA/Meraux, LA	407	22	19	366	Refining petroleum	260	Process safety management at refining site
95	Syntax Systems/Murray, UT	407	11	10	386	Car wash	700	Corporate LAN providing car-wash management data
96	Lehigh Valley Hospital/Allentown, PA	404	26	17	361	Health care	5,000	Mission-critical operation-room scheduling for entire hospital
97	AMP Inc./Middletown, PA	402	22	21	359	Electrical connectors	26,000	Decision support tools for manufacturing divisions
98	University of Maryland/College Park, MD	401	8	41	352	Education	9,000	Campuswide payroll project involving 200 departments
99	Pratt & Whitney/Hartford, CT	399	85	11	303	Jet engines	31,000	Auditing compliance, monitoring of hazardous waste spills
100	Eastman Kodak/Danville, NY	398	12	55	331	Film	100,000	Tracks supply of materials to manufacturing plant

Is yours an InfoWorld 100 company? FAX US BACK!

Though our search was exhaustive, it's possible we failed to uncover every innovative use of client/server technology in the world. If we missed your company this year, we want to be sure we have your name on the list when we start next year's search. To be considered, please complete the information below and fax this form to **(408) 867-7778.**

Company

Location

Your name and phone number

Describe your company's use of client/server technology

What's the most innovative aspect of your client/server implementation?

Describe the most innovative project underway

What's the best way to reach you for additional information?

How the companies that sell client/server products use the technology

BY SANDY REED

Technology companies love to talk about all of the wonderful systems and applications their customers are creating, but they're a lot less eager to open up about the systems and applications they are creating with their own tools.

While the research firm was surveying mainstream companies about client/server, *InfoWorld* editors asked the leading suppliers of client/server technology to tell us about their projects. We sent the same survey to 17 technology companies that the research firm sent to the businesses.

Only a handful agreed to open up about their use of client/server.

• Hewlett-Packard Co. in Mountain View, Calif., decided to replace its "legacy-based architecture" in less than four months after realizing that the company's product warranty file was reaching the limits of physical storage. The project, which HP says is in alpha stage, makes heavy use of tools sold by HP.

• PowerSoft Corp. of Concord, Mass., also has a client/server project in alpha stage. It is designed to replace the mini-based order-entry system and to show off the company's PowerBuilder tool. "We believe PowerBuilder is the best client/server development tool available and want to showcase applications built with it." Coding began in December 1993.

• Digital Equipment Corp., of Maynard, Mass., meanwhile, has had a project in production since October 1993. The project, which has an estimated payback time of 13-18 months, replaced human resources transaction processing systems with a single U.S.-wide distributed application environment. The company says the project has both "aggressively" cut costs and significantly improved access to data. While it's not exactly in alpha stage, it's also not exactly at mission-critical stage yet, either. Scheduled to be available to 40,000 employees someday, it now reaches 350 in 40 locations.

• Texas Instruments of Plano, Tex., is in the midst of an ambitious multiyear, multiphased project "to manage the implementation of new information technologies and infrastructures to transform TI's primary computing environment to an open enterprise distributed computing environment." Called PEER1, it began in July 1993 and is also meant to be a showcase use of TI's client/server tools and skills.

The only company that flatly declined to fill out the questionnaire was Intel Corp. After reviewing the survey, an Intel spokesman called with a message: "This doesn't apply to us and we won't be participating in the survey." Representatives from IBM, Apple Computer Inc., Gupta Corp., and Microsoft Corp. called with questions or progress reports, but never returned the surveys. Still looking for client/server projects to talk about, presumably, are Novell Inc., Sun Microsystems Inc., Tandem Computers, Oracle Corp., Sybase Inc., Informix Inc., Gupta Technologies Inc., Borland International Inc., and Lotus Development Corp.

Sandy Reed, a writer and editor based in Saratoga, Calif., specializes in technology.

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mainstream technology. To get a fix on client/server in 1993, Forrester Research Inc. had to rely on vendors' references and round up the usual early adopters. No more. When it came time for this year's research, 80 percent of the companies it randomly selected were targeting all of their new-development resources into distributed technology. And they're taking the technology to new heights: The average Fortune 1000 company active in client/server in 1994 is pushing the technology harder than the leading 1993 users, according to a recent Forrester report. Thirty-eight percent of applications had more than 50 users, the size of development teams has blossomed from a handful of programmers to 11, and the projects are becoming more complex with 37 percent relying on two or more databases.

WHO ARE THE INFOWORLD 100? Some of the companies whose projects we highlight here are household names; some aren't — yet. Large businesses make up the bulk of the list. True to the ultra-careful pace with which big business generally approaches change, the large companies in the survey are much likelier than medium to small businesses to have projects in the pilot stage. Among companies with 20,000-plus employees, one-fifth are still studying their client/server projects as pilots.

But there are exceptions. To boost employee productivity, the corporate information center at Daytons (#46), the retailer based in Minneapolis, Minn., has rolled out a suite of productivity boosters, including word processing, spreadsheets, graphics, database, and presentation to 100,000 employees in its stores.

Plenty of small to very small businesses are also finding client/server architecture useful for their business goals. With 94 employees, New York-based Market Vision (#3) implemented a client/server package to provide real-time financial data to its formidable Wall Street neighbors, brokerage houses, and banks. Tiny National Hospital and Health Care Services (#4) thumbed its nose at client/server conventions and set up a GUI-less distributed billing system for its 54 workers. No Microsoft Windows? No problem.

Good news for taxpayers is that government is as enthusiastic about cutting costs as is the general business sector. Both the Office of the Assistant Secretary of Defense for Reserve Affairs and Arizona's Department of Transportation Motor Vehicles Division made the Top 10. And government agencies in New York and Florida made the Top 50, as did the money mavens at the Federal Reserve Bank, which recently implemented a distributed home-loan tracking system.

There are no flat-earth types among these companies. They're not just migrating existing applications, they're creating new and better ones. One third of the companies covered by the survey spend all of their client/server budget on new applications exclusively for new applications. Another 40 percent of the companies spend more than half of their client/server funds on new applications.

TOOLS AND TECHNOLOGIES. On the client side, Windows and networking, NetWare in particular, are everywhere (see related article on tools and technologies). But, Unix has a large following as well. The venerable operating system's 15 years of proven experience make it a natural choice as the foundation for an open system, says Allan R. Frank, national partner in charge of enabling technologies for KPMG Peat Marwick in Radnor, Penn.

Not surprisingly, corporate desktops have become crowded with PCs as a result of client/server. LAN use, too, is nearly ubiquitous: more than 90 percent have increased their use of LANs as a result of their new desktop platform.

Interestingly, the number one company in the *InfoWorld* 100, Motorola Inc.'s General Systems Sector, has eschewed

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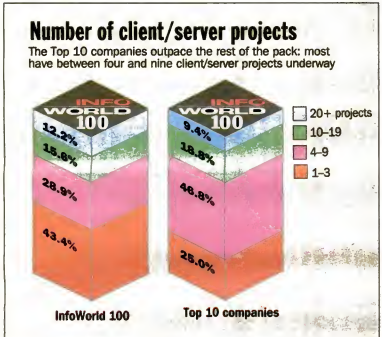

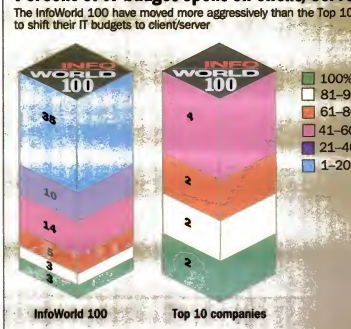

DUN & BRADSTREET SOFTWARE: THE STRATEGIC CHOICE

BUILDING VALUE FOR THE CUSTOMER

"WHAT D&B SOFTWARE OFFERS CUSTOMERS IS THE UNIQUE ABILITY TO COMBINE BUSINESS INFORMATION AND TECHNOLOGY TO FACILITATE THE BEST POSSIBLE DECISION."

R. Douglas MacIntyre
President and CEO
D&B Software

While most vendors in this industry see their business as technology or service, for D&B Software these are the intermediate steps. D&B Software views the key issue as information: how to give its customers timely, reliable and relevant information. The objective of the company's SmartStream series of business productivity solutions is to provide enterprise-wide technology that helps customers turn information into better decisions — decisions that drive their profitability and competitiveness.

INFORMATION IS THE SOURCE

D&B Software's unique position grew out of the 1990 merger of Management Science America and McCormack & Dodge, two companies with over 50 years of combined experience and proven expertise in providing 40,000 transaction-oriented business solutions to over 10,000 customer sites. To this background in technology and customer service, D&B Software adds the 150 years of experience of its parent, The Dun & Bradstreet Corporation.

With over $4.7 billion in revenue, D&B is the world's largest provider of value-added business information, software and decision support services. The company's overall mission is to make business information available, convenient and useful to its thousands of customers around the globe. D&B Software's SmartStream series is the integrating platform — the place where customers can analyze information from all sources. It is a process the company calls "moving up the decision value chain," the path from raw data to valuable knowledge.

TECHNOLOGY IS THE MEDIUM

Technology makes this process a reality, through the SmartStream application suite. Designed from scratch as a client/server application, SmartStream offers the most from D&B Software's capabilities: a history of reliability, performance and usability; an understanding of real-world business processes; and an emphasis on increasing business productivity.

Rather than porting its mainframe products to client/server, D&B Software developed SmartStream from a different paradigm. Based on research and customer input, it created an enterprise model, a "virtual company" composed of over 1,000 business processes that showed the data needs, workflows, activities and hand-off points encountered by every organization. This enterprise model forms the basis of all the functions that go into the SmartStream product suite. With it, the company was able to incorporate into SmartStream the best ways to route information, to identify information needs that were typically not met and to create solutions that can cross traditional department and application barriers to meet business objectives.

While using the enterprise model as a new approach to designing the business functions of software applications, D&B Software also took a new route in the design of the technical architecture. SmartStream products are based on a layered, open technology foundation. Industry-standard tools for databases, graphical user interface and communications are used as the "enabling platform" for a set of robust transaction-processing applications. These applications, in turn, feed data to another layer of cross-organizational analysis tools.

The flexibility of SmartStream's technical architecture also allowed D&B Software to design in the capabilities that its customers said were most vital. SmartStream features include:

- A true distributed architecture, with maximum processing performance and network-design choices.
- Enterprise-wide coverage that manages activities across the organization and allows information to flow seamlessly across applications.
- Configurable workflow to integrate users and their jobs with real-world business processes.
- A step-by-step migration process to client/server that minimizes risk and investments at all stages.
- Complete global capabilities for efficient operation with different currencies and national standards.

Customers see the open technology foundation as one of SmartStream's competitive strengths. Phillips Cables Ltd., a Dun & Bradstreet Software

customer, is one of Canada's largest manufacturers of wire and cable products, with over a thousand employees and manufacturing facilities across Canada. Bob Culmer, Phillips' Director of Information Technology, recently chose to implement Financial Stream and SmartStream Decision Support for the company's accounting information needs. These applications run on an HP 9000 Series 800.

"The technologies D&B Software uses for SmartStream — Windows, Sybase SQL Server, PowerBuilder, TCP/IP — are also the technologies on which we've standardized for internal application development," says Culmer. "That means we'll have greater possibilities to integrate SmartStream with our own applications, and better internal support capabilities by working with the Hewlett-Packard platform our developers already understand. HP is also the optimum solution for us because an open systems approach supports our long-term goals for distributed computing."

Decision-making is the Result

In the Information Age, all employees have become "knowledge workers" to one degree or another. Productivity gains flow from the value of their decisions, allocating people, time, money and other resources to meet enterprise goals.

Every business generates a wealth of decision information every day. For example, each sales order tells a company something about its competitive position and marketing performance. The problem, of course, is that few managers have enough time to extract and format this information so it can tell them where their business is going and how they should guide it.

To make decisions that positively impact your company's performance, profitability and value, people need decision support tools that increase the timeliness and usefulness of decision information. This is the core function of D&B Software's SmartStream platform. Applications such as Financial Stream, HR Stream, Manufacturing Stream and Distribution Stream efficiently gather the data generated in everyday business processes, from sales to deliveries. SmartStream Decision Support then turns these data into decision information, delivering the knowledge people need for decisions that reduce costs, enhance competitiveness and improve the bottom line.

With better decision-making, customers can improve their business processes, fine-tuning activities for optimum information flows and faster time-to-decision. As a blueprint for process reengineering, SmartStream helps customers construct more efficient business processes to gain tangible returns on their information technology investments.

For more information about D&B Software solutions, call 1-800-290-7374.

Dun & Bradstreet Software

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Bye bye, mainframe

When we asked what factors went into the decision to use client/server technology, we expected responses about cost, user needs, and data access. Indeed, more than two-thirds of the respondents gave answers that fit into those categories. Nearly one-quarter of the companies also cited a desire, decision, or direction to decrease mainframe use. Here are some of the specific factors cited in each of the areas.

Decrease mainframe use

"It is the direction of the company not to develop on the mainframe."
— Financial institution

"Cannot enhance mainframe so we looked into other options (mainframe is outsourced)."
— Insurance company

"It was a downsized, cheaper solution to offload applications from the mainframe."
— University

"All new development needed to be on PCs; not more mainframe applications being developed."
—Aircraft/aerospace company.

"Wanted to eliminate mainframe use, saving the company $120 million per year."
—Consumer electronics company

Cost

"It was strictly an economic decision to save money."
— Service industry company

"Adaptability, allow for incremental costs, and not a huge upfront in capital."
—Utility company

"Cost and simplicity."
—Consumer electronics company

"Price/performance; the ability to deliver CPU power to clients directly."
—University

User related

"It was the only way to give users the flexibility needed to obtain information."
— Pharmaceutical company

"People wanted to get more use out of their PCs."
— Financial services company

"Wanted users to be able to access data more easily and to develop reports."
— University

"Usability. Training took less time because of the familiar environment."
— Health care company

Data accessibility

"The only thing available for multiple users sharing data and needing immediate access of data."
— Health care company

"The need to have a tremendous amount of information immediately accessible through the branch's network."
— Hospital

"Provide representatives with online customer information faster and more accurately."
— Communications company

"It was the only thing that was available to give timely information."
— Chemical company

"Ability to pull information from multiple sources at the desktop."
— Insurance company

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Client/server payoff

both. It is one of only two surveyed companies that has *decreased* its use of PCs. Running Unix as its distributed platform, the Arizona-based division has replaced almost all of its PC inventory (road warriors still use laptops and notebooks) with X Window terminals. It relies on TCP/IP for all of its networking needs. With 80,000 PCs in use companywide, though, Motorola is still the leader when it comes to deploying desktop PCs.

Don't count mainframes out yet. Big iron continues to hold its own among big business. One half of the companies with 1,000 to 5,000 employees rely on mainframe computers as much as they ever have; among larger companies (5,000 employees or more), one out of five agree that client/server architecture has had no impact on their use of mainframes. But the refrain of "mainframes-out-the-door-in-'94" has been heard regularly in recent years, and plenty of companies are weaning their computing architectures off the glass-house behemoths: two-thirds report they have reduced their mainframe use. And a small percentage (9 percent) are going all out, converting all of their legacy applications to client/server.

Midrange machines are finding new life in large companies' distributed schemes, and client/ server may in fact give new life to minicomputers. Respondents are evenly divided on whether their use of client/ server has increased, decreased, or had no impact on their use of midrange machines, with a slightly larger number saying it has increased their use.

RISING TO THE TOP. What separates the Top 10 from the others? For one thing, they're enthusiastic boosters of downsiz-

Where the technology dollars are spent

Big 3 database servers

Just over half of the InfoWorld 100 are deploying these database servers

	InfoWorld 100
Oracle	24%
Microsoft SQL server	15%
Sybase system 10	12%

Legacy application conversion budget

The InfoWorld 100 are using a greater percentage of their client/server budgets to convert legacy applications than the Top 10

% of client/server budget	InfoWorld 100	Top 10
None	33.7%	30%
1–49%	29.2%	30%
50–79%	20.2%	30%
80–99%	7.9%	10%
100%	9.0%	0%

New application development budget

Over 70 percent of the InfoWorld 100 are spending more than half of their client/server budget on new applications

% of client/server budget	InfoWorld 100	Top 10
None	9.9%	0%
1–49%	17.6%	30%
50–79%	28.5%	30%
80–99%	12.1%	10%
100%	31.9%	30%

Desktop operating systems

No surprise: DOS and Windows dominate the desktop, but the Top 10 are relying on Unix to drive more of their desktops than the InfoWorld 100 overall

	InfoWorld 100	Top 10 companies
DOS	77%	70%
Windows	70%	70%
OS/2	29%	40%
Unix	27%	50%
Macintosh	25%	30%
Windows NT	18%	30%

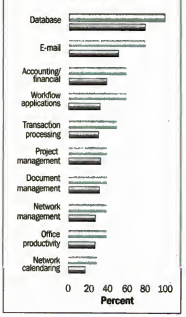
LAN operating systems

NetWare is king of the LAN hill, but IBM LAN Manager, OS/2, and Windows NT are strong among the Top 10 companies

	InfoWorld 100	Top 10 companies
NetWare 3.x	67%	60%
NetWare 4.x	13%	10%
Apple	5%	10%
OS/2	5%	20%
Windows NT	5%	20%
IBM LAN Manager	2%	10%

Top 10 applications

The Top Ten companies are deploying E-mail and workflow applications more aggressively than the InfoWorld 100 overall



ing: Three of the Top 10 are off mainframes for good. They're also not shy about the projects they take on. Four are actively moving heavy-duty transaction processing applications, once considered the exclusive domain of the glass house, to the distributed model.

In addition, they are not reticent about client/server expenditures.

The Top 10 mirror the rest of the companies on the list in their spending patterns. The smallest companies in the *InfoWorld* 100 are aggressively funneling IT dollars into client/server projects. As companies increase in size, their motto becomes moderation. NHC and Standard Commercial Corp. (#7) are both emptying 100 percent of their IT wallets into client/server projects. The remaining Top 10 companies are somewhat less generous, pumping an average of 73.5 percent of their budgets into client/server architectures. Most also worked with deliberate speed. Standard Commercial Corp.'s downsizing project for its tobacco division was a smoker: In just over 24 months, the division had blown through the planning and production phases and even sold the mainframe.

In this diverse group, the most significant common denominator is an intense customer focus. In today's businesses, with their flattened hierarchies and horizontal models, "the only thing that's important to the business is the customer," says KMPG's Frank. "The customer is in the middle of everything — billing, sales, distribution and logistics."

That's true no matter whether the industry is manufacturing, service, or even education. When students returned to classes in Everett, Wash., the school district (#5) was halfway through a $15 million technology upgrade that will give its 27 schools one of the most advanced information networks of its kind in the country. The project's primary goal is to enable better communication — teacher to teacher, teacher to student, student to student — and to help everyone get elbow deep in some of today's hottest computer technologies.

IT'S ATTITUDE THAT COUNTS. As the diversity of the Top 10 demonstrates, successful client/server implementation is less a matter of formula than of corporate outlook. In general, the pinstripe-suit, executive-dining-room crowd doesn't lend itself well to skillful management of distributed computing, and therefore doesn't show up on the *InfoWorld* 100.

Is innovation included among your company's corporate goals? Can your company manage teams? If failure is a dirty word at your employer, you're not ready for client/server. Innovation comes from allowing for frequent misfires. It's not about shouting *eureka* at a single, serendipitous discovery.

At its Iowa City customer-service center, MCI Communications Corp. (#2) equips its employees with the tools and the freedom to try out quick prototypes of ideas as they come along. "In less than 24 hours, an idea comes out of marketing, gets put into play, and, even if it's a catastrophe, it's only on 15 workstations," says John Gerdelman, senior vice president for consumer markets.

HUMAN FACTORS. Managing the human factors of change is often a greater challenge than unruly network protocols. Innovation for the *InfoWorld* 100 companies applies to management, too. At top-ranked Motorola, William Connor, vice president of IT for the company's General Systems Sector, oversaw the wrenching changes that affected 300 mainframe programmers who faced the chilling prospect that demand for their specialty had dwindled, and that a return to the development classroom was necessary to learn Unix and fourth-generation (4GL) development tools and programming languages.

To quell the uneasiness, Connor turned first to the "informal leaders" among his staff. Whether they're in application development or database management, informal leaders are typically in non-supervisory positions, Connor says, and "they're the ones you go to when you have a problem. They usually like their status position, and if you don't bring them in as leaders when you change your environment, you've lost a valuable person in your organization." The tactic worked, and Connor says the Unix and 4GL training was less a new language for the mainframe programmers to learn than it was a variation on technology they already knew.

Newer businesses, free from the expenses of retraining, are building change into their organizations. Allen Hamilton, MIS manager for Veka Inc. (#38), attributes his company's easy adoption of client/server to his involvement with employees there. "I ask each department what they need to make their jobs easier, and then I make them part of the process. As long as you do that, it's unbelievable how far you can go. The departments train themselves. They're very self-motivated."

HOW HARD IS IT? As everyone knows, implementing distributed applications can be a frustrating, sweaty undertaking. So well known are the headaches of client/server implementation that some participants, in response to a question about the obstacles their projects encountered, answered simply: "the usual." Indeed, the list of problems forms a litany of techno-nightmares: balky development tools, integration incompatibilities, connectivity kinks, petulant protocols. Meeting-room roadblocks also proved formidable. Participants cited stubborn MIS staff members and end-users, not to mention one weary respondent's note of "senior management's lack of understanding of time and money needs." (See related article for details.)

But take heart. Some respondents breezily answered "none" to the survey question on implementation problems. Among these confident respondents was Hamilton, of Veka Inc. With a young programming staff eager to try the new technologies, Veka has been smoothly implementing client/server applications since 1990. The vinyl extrusion company, which makes the raw materials from which window frames are made, automates all of its operations and runs them on a mixed NetWare 3.11 and 4.01 network. Having completely and successfully automated operations at its Pennsylvania plant, it plans to open a Nevada facility to serve its west coast clients.

As you scan the accompanying charts and read the profiles of the *InfoWorld* 100 Top 10 that follow, you'll no doubt be struck with the thought that the only real constant is change.

And as the companies' stories show, there's no better time to try it.

Deborah Asbrand is a freelance writer based in Boston.

Who are the InfoWorld 100?

General business	16
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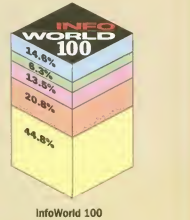
Transportation	8
Financial	8
Energy/chemicals	6
Publishing/media	4
Telecommunications	4

Length of planning process

Most companies spent a year or less planning their client/server project



InfoWorld 100

- 24+ months
- 19–24 months
- 13–18 months
- 7–12 months
- 1–6 months

Clients, servers, users, locations

The Top 10 companies' client/server projects are reaching more users with a greater number of client and server machines than the InfoWorld 100 overall

Number of client machines

		Average	
1-99	22.2%		
100-999	62.6%	InfoWorld 100	Top 10 companies
1,000-9,999	13.1%	628	2,841
10,000+	2.1%		

Number of servers

		Average	
1-10	73.2%		
11-99	22.7%	InfoWorld 100	Top 10 companies
100+	4.1%	25	145

Number of users the project is accessible to

		Average	
1-99	16.0%		
100-999	61.0%	InfoWorld 100	Top 10 companies
1,000-9,999	17.0%	1,493	3,493
10,000+	6.0%		

Number of locations the project reaches

		Average	
1-9	68.4%		
10-99	19.4%	InfoWorld 100	Top 10 companies
100+	12.2%	51	47

Impact of client/server on use of hardware

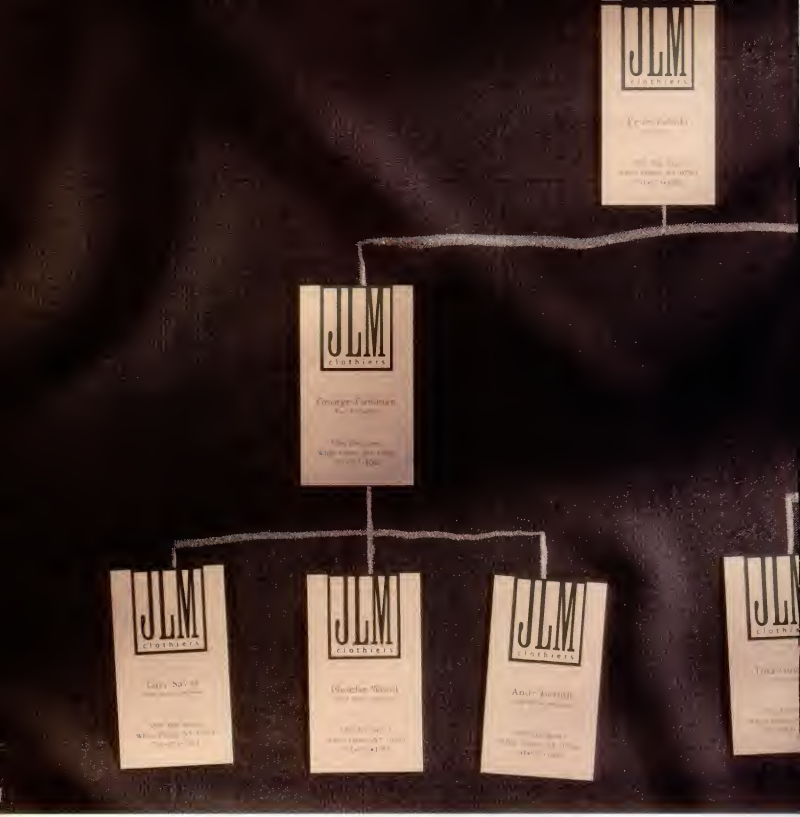
Over 90 percent of the InfoWorld 100 have increased their use of LANs, while 61 percent say they have decreased their reliance on mainframes

	LANs	PCs	Mainframes	Minis
Increased	90.8%	90.8%	16.3%	36.5%
Decreased	1.0%	2.1%	60.5%	32.4%
No impact	8.2%	7.1%	23.2%	31.1%

Impact of client/server on use of software

Over 85 percent of the InfoWorld 100 have increased their use of LAN and PC software, while 58 percent say they have decreased their use of mainframe software

	Mainframe	LAN enabled	PC productivity
Increased	15.3%	88.7%	85.4%
Decreased	58.8%	1.0%	3.1%
No impact	25.9%	10.3%	11.5%



These days, all it takes is a little success to overload your business. The more you demand of your computers, the slower things can get. Well, that's because PCs are made to be PCs. And at this point, what you really need is a server — the most efficient way to get your PCs working together.

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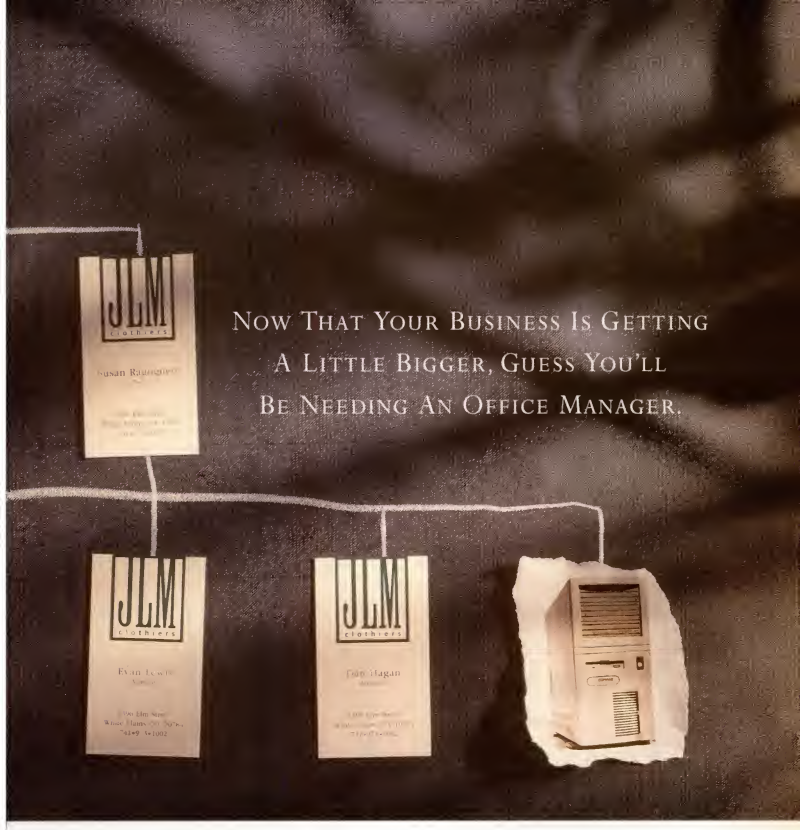

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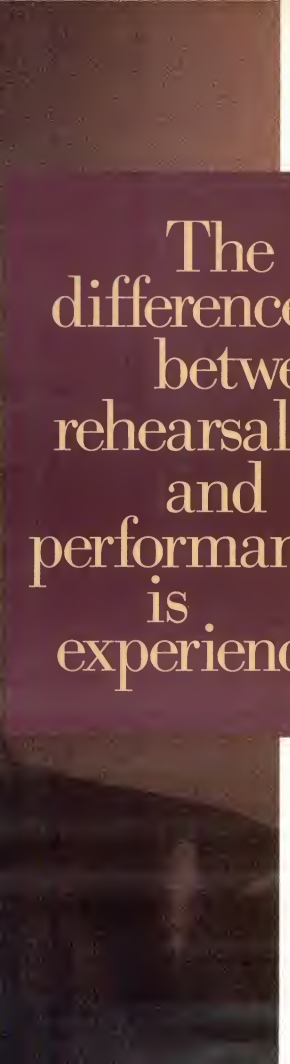
COMPAQ



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#1

Motorola Inc.'s General Systems Sector

Motorola reaches the top by watching the bottom line

By Deborah Asbrand

Motorola Inc.'s General Systems Sector (GSS) masterminded its client/server conversion by flouting some of the very qualities considered to be the distributed technology's strong suits.

Tightly integrated applications that afford greater efficiency? Forget it, says William D. Connor, corporate vice president for information technology. A too-tight fit among applications "is a drain on your system's ability to change."

Create custom applications? No way. "We'd like to never again write a custom program," says Connor.

As for other purported reasons — improved application control and employees' freedom to carry out work they previously lacked time for — Connor has one word: "Nonsense."

Despite those contrary positions — some might say because of them — the GSS has succeeded where many organizations have failed. In 1990, GSS's MIS staff bulged with 300 people to support a $1.4 billion mainframe-based organization. Today, the sector, which has rocketed to nearly $6 billion in revenues from sales of its cellular telephones and computers, support its open distributed environment with a trim 250 employees. Its implementation landed at the top of the *InfoWorld* 100 because every action was smoothly choreographed with one simple goal: reduce costs.

REALITY CHECK. GSS was motivated not by vision, but by reality. In its two cellular groups, brisk competition was driving down the average selling price of cellular telephones by 25 percent each year. The computer group, born in 1982 from the merger of two organizations, found itself with two complete mainframe-based computing systems. Costs had to be cut. Downsizing computing systems was mandatory.

An important part of Motorola's cost-cutting strategy was not to equivocate over moving off the mainframe, according to William D. Connor, corporate vice president for technology.

REID PAN-AGRA PHOTOGRAPHY

Project at a glance

Description
Moved all computing for entire business sector off the mainframe

Business benefit
Dramatically reduced costs

Most surprising result
"The cost reduction. We knew we could save money, but we've been surprised by how much. At the end of 1991 we did a study of business computing costs at five manufacturing companies. If we had continued to run our MIS department at 3.2 percent of sales like they were — which is actually not bad at all — we would have spent another $50 million. Our costs now run at .9 percent of sales, and if we take into account our huge growth in sales, we've probably saved about $120 million."

Advice
Involve top management and get their support.

Buy software rather than develop it. But if you have to develop software, use CASE tools and 4GLs; forget Cobol.

An important part of GSS's strategy was its decision not to equivocate over moving off the mainframe to Unix. That client/server-or-bust attitude avoided any turf battles between mainframe and PC programmers. "We didn't waffle on it and polarize our people," says Connor. "No one was hanging on to the mainframe. They knew everything was coming off."

With third-party software developers increasingly adding Unix to their products' platforms, GSS quickly made a second key decision: MIS would get out of software development. It was an easy decision, says Connor. "Imagine buying WordPerfect for $250 — or imagine spending tens of millions to develop it and more to support it." Commercial Unix software has all the functionality of mainframe programs but is an order of magnitude lower in price, he says. "The support costs typically run at 10 to 15 percent — a massive cost reduction for us." Indeed, tending legacy systems was draining budgets and crippling the business' ability to adopt new technologies. The Tempe, Ariz.-based computer group, for example, spent its entire MIS budget — about 4 percent of the group's sales — on mainframe maintenance.

COMPARISON SHOPPING. Proprietary solutions, too, were out. To discourage any hint of vendor dependence, GSS's MIS departments would select the software that best met their groups' operational needs and then go comparison shopping, giving their business to the vendor that offered the best price/performance.

On employee desktops, X Windows terminals were installed rather than PCs. With their potential for processor-upgrade headaches, not to mention the fearsome possibilities of injecting viruses into the corporate computing system and leaking important data out, stand-alone PCs contradicted the sector's mantra of cost reduction. X terminals cost more initially but "last until the glass goes," says Connor. For connectivity, the groups used TCP/IP. With application management easily handled from the servers, there is no need for network management and no need for network operating systems.

PCs are still a key part of Motorola's technology mix. Connor estimates that 5,000 are still in use in GSS. According to the research firm Trish Associates, Motorola's approximately 100,000 employees use 80,000 PCs.

> **"We didn't waffle on it and polarize our people. No one was hanging on to the mainframe. They knew everything was coming off."**
>
> *William D. Connor*

Converting the Cobol-trained MIS staff proved easier than anticipated. After some layoffs and reassignments, the staff was schooled in fourth-generation languages (4GL) and CASE tools and styled into business analysts. With database tuning and development now left to vendors, MIS employees turn their technical problem-solving skills to issues such as cycle-time reduction and examining inefficiencies in cross-functional processes.

POCKETS OF WASTE. Savings for the sector have mounted. Connor estimates the switch to distributed computing has produced sectorwide savings of $50 million. "You hear that to succeed with client/server, you need to increase IT costs and decrease user costs, but in actuality both should come down," says Paul Watz, MIS director for the computer group. Watz did just that. He lowered his group's headcount by half and the expense budget by 65 percent. Riding the cost-reduction wave, MIS also turned up pockets of waste in the user community. Discovering that users read only a handful of totals from the six-inch thick financial reports that MIS generated, Watz's group trained them to use decision-support tools instead — effectively crossing off report generation as one of its functions and paring paper usage by two thirds.

In a sense, GSS's client/server mission will never be accomplished. In its business, sales boom but product list prices plummet. As a result, the sector is on an endless hunt to snip costs. True to his stated principles, while other participants in the *InfoWorld* 100 survey required several sentences to describe their project's goals, Connor needed just two words: *reduce costs.*

#2

MCI Communications Corp.

MCI dials up Friends & Family with client/server

John Gerdelman clearly remembers the planning meeting in late 1990 when MCI Communications Corp. staff members were still puzzling over how they would execute the company's latest idea for a new calling product.

For the new service to work, it would require a cavernous database, sophisticated linking within the database itself, and split-second response times.

Oh, yes. And MCI wanted to roll it out to customers within 100 days.

With no time to deliberate over near-ancient mainframe development methodologies, the staff was unsure how to make its idea work. "Finally someone said 'let's do it on the PC,'" recalls Gerdelman, MCI's consumer markets senior vice president for sales and service operations. "There was silence. Then we said 'OK.'"

BUILDING A FOUNDATION. So was born Friends & Family, MCI's marketing brainchild that launched deep discounting in long-distance calling services. Since its March 1991 introduction, Friends & Family, which offers 20 percent discounts on calls for individuals who sign up for the service as a group, has become the company's flagship brand, winning 10-million customers — most of them snatched from arch-rival AT&T — and spinning off several other successful calling products for the company. The architecture for Friends & Family also became MCI's foray into client/server and the foundation on which it based its entire customer-service organization. This fall, it will make another bold move when it converts its Digital Equipment Corp. VMS telemarketing operation to NT-based client/server architecture.

PAIRED DATABASES. While it has ramped up its servers and workstations to take advantage of new processing muscle, MCI's customer-service operation still maintains the system design originated for Friends & Family. At the hub of each of the Washington, D.C.-based company's 11 customer-service centers is a large bank of OS/2-based IBM 90 servers housed in the computer room. Each server powers the workstations of approximately 12 customer-service representatives. Key to the success of Friends & Family is its use of a paired database, which is a tweaked version of Microsoft SQL Server for OS/2. It allows MCI to match callers with the calling circle they belong to and process the 20 percent discount.

The company's client/server effort may have started on an ad hoc basis, but "we now have a very definite strategy for the desktop and midrange," says Gerdelman. "A key part of the strategy is to make a seamless environment where any rep can get the information they need about a customer instantly." The customer-service reps are already plugged into MCI's information web, connected to each other via LAN Server and Novell LANs and connected to the rest of the company via a Cisco router network and T1 and fiber-optic links.

In addition to the telemarketing application that goes into production this fall, NT will help MCI automate other functions. To better understand customers' needs and evaluate its telemarketing programs, its quality-monitoring team listens in on about 12,000 customer-service and telemarketing calls per month, then uses the information to fuel its customer-satisfaction efforts. In the past, the monitors recorded data on a checklist, entered the information into an Excel spreadsheet, and used a macro to roll it up. Now they sit at workstations and the calling information is tabulated, sent to the servers for compiling, and automatically redistributed to the marketing group.

THE NEXTSTEP. MCI is exploring other new distributed options. It's looking to build its skills in Unix as well as object-oriented programming. Senior directors and vice presidents, in fact, have been trained in object technology. Among the tools used by developers is NextStep. "Next is the only pure object-oriented system today," says Gerdelman. "Next running under Unix is a powerful option." Gerdelman also plans to eventually convert the company's 4,000 operators to client/server. In MCI's rapid-fire business, seconds translate into savings. "The average customer-service call is 5 to 6 minutes," says Gerdelman. "When you add it up, it's $5 to 6$ per call, so if we save 10 seconds per call, that's a big savings."

ROBERT SPOTSWOOD/INTERNATIONAL

The need to roll out the Friends & Family calling services within 100 days was a major factor in MCI's decision to make it a client/server project, according to senior vice president John Gerdelman.

With no time to deliberate over near-ancient mainframe development methodologies, the staff was unsure how to make its idea work. "Finally someone said 'let's do it on the PC.' There was silence. Then we said 'OK.'"

John Gerdelman

MCI also follows the distributed model for its IT organization, which deploys development teams, armed with Visual Basic and PowerBuilder, to its service centers. "Developers are tied to the front line of business," says senior manager Kevin Burns. "We're not developing in an ivory tower. We want to create the application, get it out, and see if the users like it. And if they don't, we can fix it."

—Deborah Asbrand

Project at a glance

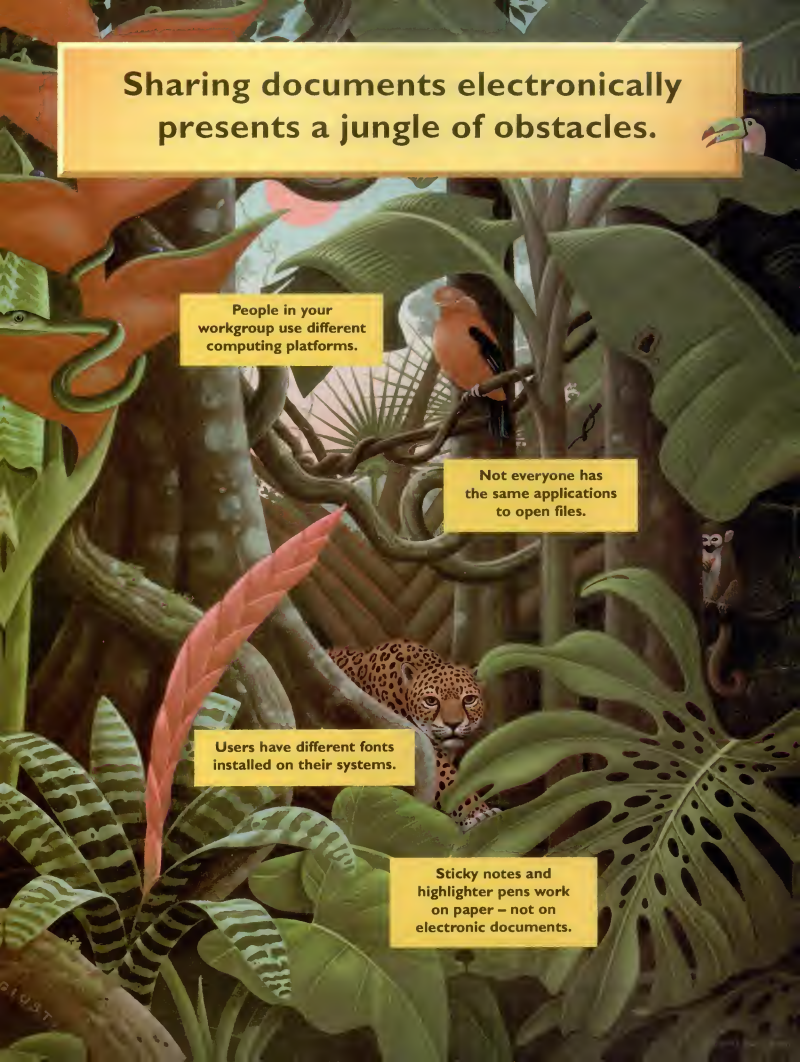
Description
Foundation for the Friends & Family calling services plus overall customer-service operation

Business benefit
Speed, accuracy and agility

Moving the development process closer to the user

Most surprising result
Increased revenue through faster customer service and telemarketing operations

Advice
To better understand what your customers want, use their point of view as the basis for your client/server project. This strategy will bring the developers in direct contact with the end users they are coding for.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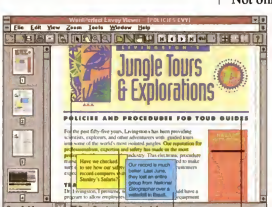

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#3

Market Vision

Flexible networks distribute savings and real-time data

By David Baum

The lure of reduced cost and greater user control has caused many financial houses to push aside their well-entrenched mainframe-based data distribution systems in favor of newer, more versatile client/server architectures.

Data distribution systems are real-time systems that stockbrokers and financial analysts use to stay abreast of the continually changing financial markets. They monitor data feeds such as those from Reuters, Dow Jones, and Knight-Ridder, each of which report ticks, or changes, to hundreds of thousands of securities.

Until recently, most financial firms used host-based systems to capture real-time market data and spit it out at dumb terminals, where securities traders could observe changes to one or more securities but had little or no means to perform on-line analysis. But today's data distribution systems take advantage of distributed processing models to allow much greater flexibility for how data distribution networks can be configured among servers, as well as powerful front-end client workstations to help traders select, analyze, and manipulate data.

MULTIPLE DATA FEEDS. The client/server data distribution system developed in-house by Market Vision is a good example. Where most trading systems can handle only one data stream at a time, Market Vision's MV Link offers an expandable shared-memory architecture that allows for multiple data feeds per server. Market Vision, based in New York City, used to sell only host-based data distribution systems.

MV Link uses a modular distribution model to connect large trading businesses into a distributed trading enterprise, explains Elizabeth Sendewicz, Market Vision's director of product marketing. A single MV Link network can consist of several trading floors and sales offices, as well as direct connections to home and customer systems. A distributed publish and subscribe type of technology allows any client or server on the network to broadcast data to any other client or server, Sendewicz says.

Market Vision president and chief operating officer William F. Adiletta says one of the biggest eye-openers in the company's odyssey with client/server development has been the radical hardware cost savings that client/server can bring. One customer was able to reduce the total number of servers on its trading floor from 20 to 5, for instance. Typically, a Market Vision server will support between 20 and 40 clients.

MV Link users, primarily securities traders, can point and click to select the relevant information from the overall stream of data, pulling it back to their PCs for analysis. From there, they can create graphics, perform analytics, do risk management, and display quotes — all with the flexibility and speed of local desktop processing power. Users can also publish their results back out to the network for other users to access.

FLEXIBLE NETWORKS. Such flexibility is vital. "The client/server model allows a server to be devoted to the input of all the different data feeds, while the client machines can do other types of processing," notes Paul Delano, a programmer/analyst at the firm. "This is the key to the flexibility of our networks."

In addition to flexibility for how data streams can be monitored by the servers, there are big cost savings on the client side. "You don't need a very robust station just to pull data into your spreadsheet or graphics package," Delano points out.

MV Link's customers like the ease with which fault-tolerant backup systems can be established on a client/server network. All MV Link client/server connections support automatic fail-over, in which a process connecting to a server will automatically switch to alternate servers if the desired server is not available.

"If a server goes down, the client applications supported by that server can come up on another server so that financial traders never miss a tick," Delano says.

Market Vision cut its client/server teeth with Unix systems, and now offers data distribution systems for Sun OS, Sun Solaris, HP/UX, and IBM AIX, supporting Microsoft Windows and MS-DOS clients. The company is also working closely with Microsoft to put the finishing touches on a Windows NT solution.

"NT doesn't yet have the same performance for trading floor activities that Unix does," Delano says, "but we have been pleased with NT's strong debugging tools."

Market Vision developers used the exact same API on both Unix and Windows platforms, Delano says, making it easier to develop cross-platform products. The applications were developed mainly in ANSI C, using Unix System 5 sockets and shared memory, and utilize industry-standard TCP/IP protocols, he adds. High-level development tools include Code Center from Centerline and UIMX for Motif screen building.

JAMES HACKETT/DAVIS JANSEN INTERNATIONAL

Client/server projects can result in surprisingly radical cost savings, according to Market Vision president William F. Adiletta.

> **"The client/server model allows a server to be devoted to the input of all the different data feeds, while the client machines can do other types of processing."**
>
> *Analyst Paul Delano*

Project at a glance

Description
Financial data distribution systems

Business benefit
More control for users, reduced hardware cost, tremendous flexibility for configuring networks

Most surprising result
Radical hardware cost savings that can be achieved through distributed processing

Advice
Use standards and standard protocols wherever possible. Make any multiplatform design considerations at the outset.

David Baum is a freelance business and technology writer residing in Santa Barbara, Calif.

#4

National Hospital and Health Care Services

Innovative insurance brokerage doesn't do Windows

Most companies take a "join the stampede" approach to client/server computing, adopting popular technologies and setting up processing models according to conventional wisdom and industry trends. National Hospital and Health Care Services Inc. (NHC), a health insurance brokerage firm in Rosemont, Ill., is marching to the beat of its own client/server drummer.

NHC contracts with major insurance carriers to provide employee benefit plans to small- and medium-sized companies in the Chicago area. It then bundles various health benefits so that its clients can deal with a single source for all types of coverage, from vision care to life insurance. The company markets these insurance packages, manages its customized benefit plans, and handles all billing.

NHC's small but innovative IT group hasn't bought into some of the industry's most prominent myths, such as the need for Microsoft Windows — or for a graphical user interface (GUI) of any sort, for that matter.

SLOW, EXPENSIVE HOG. "Windows is not a production system, and never will be," says David Wareham, NHC's vice president of data processing. "It's too slow, it's a memory hog, and you end up having to spend a lot more for your hardware to support it."

Many users claim Windows-based applications are easier to learn than character-mode MS-DOS applications, but Wareham doesn't agree. "In either [environment] there are certain commands that you have to learn," he says. "For example, I can't see that Quattro is much different in either environment."

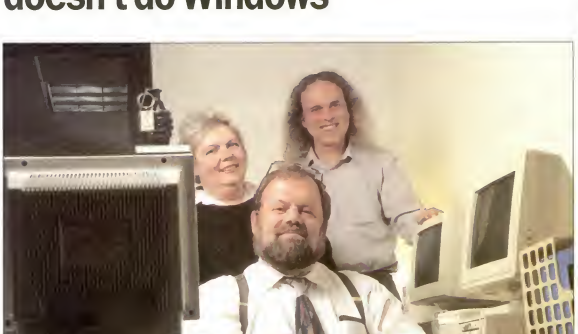
NHC's dedication to the PC began 15 years ago when the company was started with a Radio Shack Model 1. "We've never been on mainframes or minicomputers," Wareham says, "yet we have created some very robust line-of-business applications."

Wareham says his firm has been involved in client/server computing for years, which he defines as a networked, multiuser environment. "Client/server doesn't have to mean GUI," he says. "It doesn't necessarily imply a windowing system. It implies distributed processing, separation of application logic from data, and centralized applications on the server."

NHC developed most of its client/server software internally, using a program generator called The Creator, built by Bruce and P.J. Tonkin, NHC programmers. The Creator is a program and report generator that creates data entry databases along with the report procedures necessary to access data from those databases.

A key client/server application at National is a quoting and prospecting system that automates most of the marketing portion of the business. This application works in conjunction with a sales tracking system, calendar system, and project control database. All client/server applications reside on the server, where many different clients can access them.

WAN ON THE WAY. NHC has a new application under development that will link the firm's quotation system with the quotation systems of the major insurance carriers via a WAN E-mail server. This will allow NHC's quoting staff to initiate quotations, then send them on-line to each participating insurance company. The quoting staff at those companies will receive the quotations, then plug in specific rates, coverage, premiums, and a cost summary. The finished quotation will be sent back to NHC, where it can be checked and passed on to the client.



Vice president David Wareham (seated) and programmers P.J. Tonkin (left) and Bruce Tonkin contend DOS-based client/server systems are easier to build and run than the more trendy GUI-based projects.

"Windows is not a production system, and never will be. It's too slow, it's a memory hog, and you end up having to spend a lot more for your hardware to support it."

David Wareham

The interesting part about this project, Wareham says, is that the development cycle was shortened thanks to an existing import/export utility in Lotus cc:Mail that will handle the WAN messaging.

"Lotus cc:Mail has a utility that allows you to send E-mail programmatically, without ever loading and launching the cc:Mail application," Wareham explains. "We've licensed the use of this utility and can use it in our quotation application to send and receive quotes, without incurring the overhead of actually running the E-mail application on each workstation. It is a powerful utility."

Today, NHC's client/server network consists primarily of custom-configured IBM PC clones running MS-DOS. The company stores its data in a CompuAdd 486/33 server networked with Novell NetWare 3 over 10base-T.

When questioned about the underpinnings of his DOS-based client/server network, Wareham says he isn't worried, even if Microsoft stops supporting the DOS operating system. "Novell's got [a version of DOS]," he points out. "If we have to, we'll shift. To me, that makes more sense than diving headlong into an inefficient operating system just because everyone else is doing it."

—David Baum

Project at a glance

Description
DOS-based client/server network

Business benefit
Low cost, high performance

Most surprising result
That so many people equate client/server with GUIs

Advice
Stay away from Windows.

#5

Everett School District

Technology for education for the next hundred years

Elementary schools and high schools are known for their outdated computer technology, which generally ranges from sparse to downright pathetic. However, a few innovative schools are starting to move into the client/server age. Everett School District, for example, a 100-year-old district of 27 schools in Everett, Wash., is halfway through a $15 million technology overhaul that will give it one of the most advanced information networks of its kind in the country.

The primary goal of the project is to facilitate better communication — teacher to teacher, teacher to student, student to student — and to help everyone get elbow deep in some of today's hottest computer technologies.

Ken Toyn, network manager in Everett's IT group, says the school district used to fall at the end of the networking spectrum. "There were a few scattered labs at some of the schools," he recalls, "and a single VAX supporting 9.6K dial-up lines. But that was it: computers, but no integration, and no network to speak of."

Today, however, 12 out of 27 schools have new hardware, software, and networking gear, and Everett is well on its way to banishing that antiquated information systems image forever, "or at least for the next hundred years," Toyn jokes.

The infrastructure upgrade at each school includes category 5 10Base-T network topology, with fiber-optic links at key points along the wide area network. Novell Inc.'s NetWare 4 network operating system will connect the nearly 10,000 users on more than 3,000 personal computers. 3Com Corp.'s MFS-2 network hubs, NetBuilder II routers, and Boundary Routers work in conjunction with Newbridge Networks Inc.'s frame-relay multiplexers and channel banks at each site to keep the network traffic flowing smoothly.

MACINTOSH OR WINDOWS. For computer hardware, Everett is supporting both Apple Macintosh computers and Microsoft Windows PCs, depending on user preference. Each classroom will have at least one computer connected to the districtwide network.

"We're adamant about building a cross-platform network," Toyn says. "We have found that our user base feels very strongly one way or the other, so we want to support both."

These cross-platform considerations were one of the main reasons Everett decided to select NetWare 4, Toyn continues. "We evaluated several network operating systems before we came to this conclusion," he says. "The Macintosh is quite stable on NetWare, and Windows is as stable as it can be. NetWare supports both types of computers very well."

To avoid troublesome differences between the two types of computers, Everett is insisting that the user base standardize on certain cross-platform applications, such as Microsoft Word, where conversion of files is automatic. The IT group is considering using Miramar Systems Inc.'s Personal MacLAN Connect, a software package that enables Macintosh and Windows users to exchange data across platforms, send E-mail between departments, and share local hard disk storage and printers across a variety of local area networks, all from their familiar Windows or Macintosh user interfaces. Macintosh users could use the standard AppleShare Chooser interface to access PC files, which would appear as Mac file icons on their desktop.

School district network manager Ken Toyn is at the hub of a $15 million technology overhaul designed to facilitate communications between students, teachers, and administrators.

PHOTO: DAVID CAMPBELL HERTZMARK

> **"We're adamant about building a cross-platform network. We have found that our user base feels very strongly one way or the other, so we want to support both."**
>
> *Ken Toyn*

Toyn's IT group will install a Hewlett-Packard network server at each school, either Pentium or 486-based, each with about 2 gigabytes of storage and 100MB of RAM. These will run central applications, such as E-mail and resource scheduling, drive the printers, and provide file storage for administrative data.

ARCHIVES ON THE VAX. The district VAX minicomputer at Everett's Longfellow administration center will continue to archive student information and handle districtwide processing tasks such as accounting. Each workstation on the network will have a TCP/IP stack for VT terminal emulation, so teachers and staff can access these programs.

But Toyn is most excited about the impact of all this new technology on students. "Students will have a districtwide E-mail system, as well as access to the Internet," he says. "They will be able to learn cooperatively with students at other campuses, consult with off-campus experts, even develop virtual relationships with students they haven't met."

Some of the biggest challenges to the IT staff have centered on trying to make due with old software technology. "Business software vendors are pushing the technology envelope, but when it comes to educational software, the vendors are really dragging their feet. Many of them aren't ready for client/server, they aren't ready for NetWare 4, they aren't ready for cross-platform computing."

He pauses, considering some words of wisdom for his colleagues. "Humility helps," he says at last. "We quickly realized we needed to put together a strong team, and we haven't hesitated to contract with consultants to fill in for our own technical gaps. If it wasn't for a strong team, we would have been in big trouble."

—David Baum

Project at a glance

Description
Vast, intercampus information system encompassing 27 schools

Business benefit
Better student learning, more efficient administration

Most surprising result
That many educational software vendors are dragging their feet

Advice
Avoid proprietary environments. Involve users in the planning process. Don't try to do it all alone — seek outside help where necessary.

Avoiding bumps on the road to client/server

Look out for both technology and personnel hazards

BY PAUL KORZENIOWSKI

If you venture out into client/server traffic, you're likely to encounter bumps along the road. They may appear as managerial issues that arise because employees fear the changes needed to build, maintain, and use the technologies. Rapid changes can force managers to try to think like the Amazing Kreskin to figure out what will be technically possible in six months.

The bumps arise because the process of building client/server applications is much different than working with central systems — but that existing central computer infrastructure has to be dramatically altered for companies to successfully deploy client/server systems.

As a result, according to managers at *InfoWorld* 100 companies, you've got to manage change, a part of business life that not all employees welcome. Some even resist the idea of client/server computing simply because change brings uncertainty. If that's the case, experienced managers advise a gradual move into client/server technology. Start small with less-than-crucial application and build from there.

PRACTICE, PRACTICE, PRACTICE. "The first one or two applications a company builds may not come out great, but they get better as programmers become more familiar with the capabilities that client/server computing offers," notes Gary Olson, an application supervisor at the state of Wisconsin in Madison, an agency whose project just missed making the *InfoWorld* 100.

Previous experience can help ease the transition. The Arizona Motor Vehicles Division in the Department of Transportation, company number six on our list, selected only programmers experienced with Microsoft Corp.'s Windows operating system to build its first client/server application.

"Because these programmers already were familiar with the environment, they were able to progress faster than if they were learning Windows from the ground up," notes Jeffrey Wood, a systems architect for the department.

Even with a little extra knowledge, expect a steep learning curve. Mainframe and minicomputer applications are menu-based programs that function by following one set of instructions so it is simple for programmers to determine which items will be processed first. Client/server applications are free form and programs have to handle input on the fly. "There is a world of difference between building a procedural program that operates in the same manner each time and designing an event-driven program which takes user input as its queue," says Wood.

OUT WITH TRADITION. The differences force companies to alter traditional program development techniques. MIS departments must give up control over application design. "User input is key to successful design," says Wood. "The MIS department merely puts user desires into action. Programmers have to be more communicative and gather user input during the design process."

Programmers face other challenges. Processing chores no longer have to run on one system; they can function on either clients or servers, Bob Pfister, the IS director at Nichols Institute in San Juan Capistrano, Calif., notes that dividing lines are not always clear and programmers have to be willing to change program design. Nichols Institute was among the group of companies from which the *InfoWorld* 100 were chosen.

In addition to management and training issues, corporations have to overcome technical hurdles. With central applications, users work with one type of terminal and server. Client/server applications often run on a range of client and server workstations so programmers can mix and match components.

The added flexibility can create problems. In June 1993, Nichols Institute decided to move from a Digital Equipment Corp. VAX running Oracle Corp.'s database server to an open system. The institute used Novell's NetWare and wanted to limit the number of network protocols. A sales representative from Sybase Inc., Emeryville, Calif., told Pfister that a Unix version of Sybase Inc. supported Novell's IPX protocol.

After deciding to purchase the DBMS, Nichols Institute discovered that Sybase does not offer native IPX support. "Salesmen tend to get a little carried away and claim their systems have features that they lack," notes Pfister.

The problem was annoying rather than catastrophic. Nichols Institute has been

NICK FARA/ELECTRONIC IMAGES

forced to load a TCP/IP protocol stack on each PC so those users can access the Sybase DBMS. "Eventually, Novell plans to add TCP/IP to NetWare and that will eliminate the problem," Pfister says. In the interim, the company is willing to put up with the minor inconvenience.

The rapid pace of technical change also complicates the decision-making process. Stacy Kenworthy, technical director at Alexander & Alexander Inc., an Atlanta-based insurance brokerage, notes that "technology is changing so fast that as soon as a company puts one technology in place, another comes along that seems better."

See BUMPS, page 86

Keys to a successful project

Visual Basic and PowerBuilder top the list of tools

Looking for a tool to build client/server applications? Thanks to a booming population of buyers, you have plenty of options. But while many are available, Microsoft Corp.'s Visual Basic and PowerSoft Corp.'s PowerBuilder emerged as the top two tools named by InfoWorld 100 companies.

Both were named as key tools by nearly one out of every five companies. They were cited behind only GUI interfaces, backbone/networking technologies, and databases as key components of a client/server project. Such widespread use stems in part from the fact that they are simpler to use than traditional programming languages, such as Basic, C, and C++, and include graphical front ends and fill-in-the-blank items that step programmers through application development.

Visual Basic and PowerBuilder also arrive with canned software routines that programmers can incorporate into their programs rather than writing their own routines from scratch. Consequently, a company can cut application development time or spend more time improving rather than building an application.

The state of Wisconsin in Madison, which just missed the cutoff for the top 100 projects among the companies surveyed, is a Visual Basic site. Gary Olson, an application supervisor at the state, notes that many of the state's 300 users work with Microsoft's Excel. Visual Basic is the foundation for the spreadsheet's Visual Basic for Applications macro language, which enables users to automate tasks, such as calculating monthly sales revenue. Consequently, many users are already familiar with the programming language. Rather than train them in another package, the state does most of its application development with Visual Basic.

The UCLA Medical Center in Los Angeles (#29) is also a Microsoft backer. Dr. Michael McCoy, chief information officer at the center, says the medical center relies on Visual Basic and Microsoft's Access database to build its applications.

The state of Wisconsin does most of its applications development with Visual Basic.

MISSING AMENITIES. But Visual Basic has limitations. "Tools like Visual Basic are good for building windows but they lack amenities found with mainframe programming tools," notes Bob Pfister, the IS director at Nichols Institute in San Juan Capistrano, Calif.

See KEYS, page 87

Crowing roosters.

Insomniac software developers.

NEC
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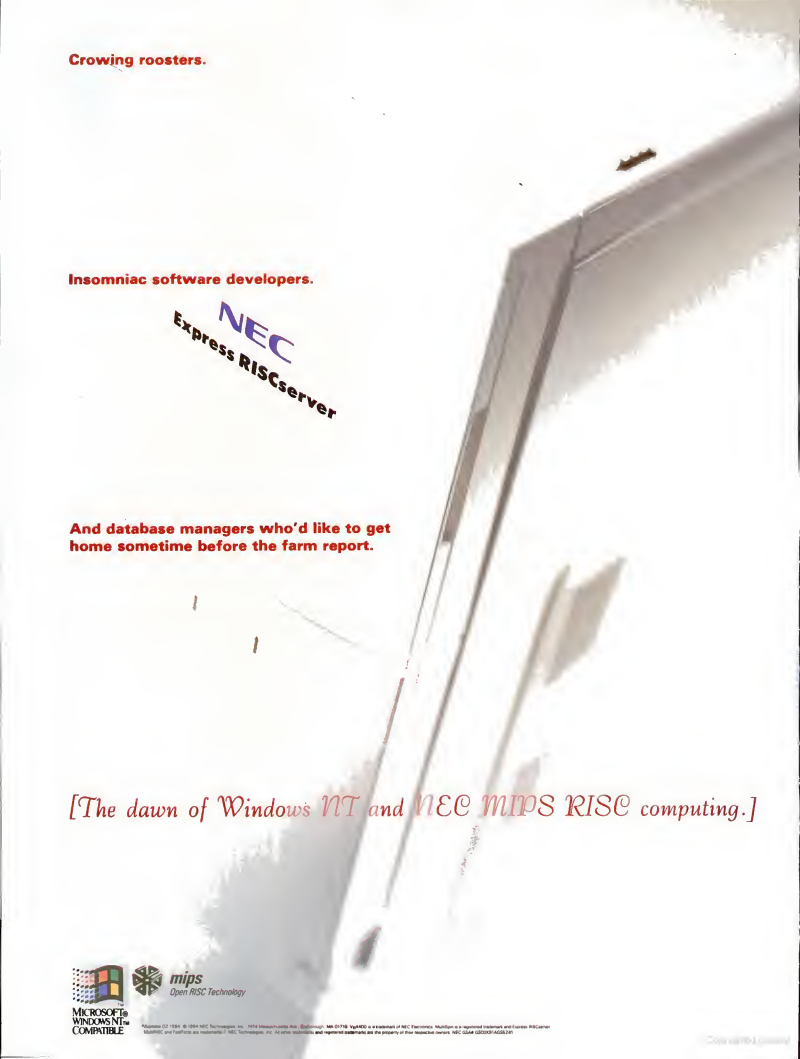
And database managers who'd like to get home sometime before the farm report.



[The dawn of Windows NT and NEC MIPS RISC computing.]

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Microsoft SQL Server for Windows NT MIPS edition

And the rest is history.

NEC

BUMPS / from page 83

On the road to client/server

Decisions at the UCLA Medical Center in Los Angeles, Calif., illustrate that problem. In 1991, the center (number 29 among the *InfoWorld* 100) outfitted its users with Borland International Inc.'s Paradox database. "At the time, no vendor was delivering a DBMS server," notes Dr. Michael McCoy, chief information officer at the center.

THE PARADOX PARADOX. At first, the users began to work with simple programs and files, which Paradox could handle. Eventually, the amount of data each user stored grew and maintaining accurate information became complicated.

McCoy determined that the center needed a more sophisticated DBMS and selected Microsoft's SQL Server. The center's transition went smoothly, but swapping out one system for another takes time a company could be spending simply improving its applications.

This time can be lengthy because programmers are no longer concerned with simply one operating system and one network protocol; they have to test applications that work with a handful of operating systems and protocols. Different components may function well separately but develop problems when lumped together. IT managers say they need better tools to identify the source of such problems. They also want more seasoned software. "We find ourselves beta testing more products than we would like," says Pfister at Nichols Institute.

RELATIVELY PRIMITIVE TOOLS. Whether client/server technology is mature enough to support most critical applications is debatable. Alexander & Alexander's Kenworthy thinks the technology is stable enough to support many firms' daily business applications. But UCLA's McCoy says that current client/server management tools are primitive when compared to mainframe alternatives; typically lacking are configuration management, recovery, backup, and reliability common to mainframes.

Consequently, the center is moving slowly into client/server computing, starting with a nonmission-critical paging application for the medical facility. For now, McCoy says, the patient record system is staying on a mainframe.

"This application is literally a life-or-death system," he explains. "To move to client/server, we would need more reliability than current products offer. I don't anticipate a short-term fix to these problems. Three to five years will pass before client/server systems will offer me the same comfort level found on mainframes."

—Paul Korzeniowksi

What, me worry?

While an overwhelming majority of the *InfoWorld* 100 companies encountered bumps along the client/server road, 13 respondents answered "none" to the question: What problems or roadblocks did you encounter? Several others noted that they encountered no problems "beyond the usual," but most respondents were more specific. Major areas where roadblocks were encountered divide roughly into three areas: technical, cultural/personnel, and obstacles attributed to being on the cutting edge. Some of the specifics cited:

Technical

"Diagnosing problems in a client/server environment is entirely different from diagnosing problems in a mainframe environment."

— Insurance company

"Connectivity issues, database memory problems on the workstations, and having to rewrite code in C."

— Transportation company

"Poor development tools on the client side. Performance problems on the server side."

— Health care company

"Expandability, availability, down time, and reliability of the system."

— Aircraft/aerospace company

Cultural/personnel

"Adjusting managers to new ideas of the new system."

— Service industry company

"Everyone has a different idea of what 'distributed' requires. Had to reorganize the computing group."

— University

"Mainframe shops are not aware of the psychological adjustment that is needed to do business."

— Financial company

"Getting consensus from different divisions regarding confidentiality for a number of the databases."

— Government agency

Cutting edge

"The MIS people didn't know what to ask of the business environment, and they in turn didn't know how to respond."

— Insurance company

"Our desire for support vs. what the vendor was willing to give."

— Hospital

KEYS / from page 83

Visual Basic and PowerBuilder top the list of tools

Keys on the client side

1. Microsoft Windows/GUI interface in general
2. Backbone technologies/networking
3. PowerSoft Corp.'s PowerBuilder
4. Microsoft Corp.'s Visual Basic
5. Database technology
6. Affordable hardware
7. OS/2 operating system
8. Language other than Visual Basic
9. Specific application other than Windows
10. Open systems

Keys on the server side

1. Database capabilities
2. Networking/internetworking
3. Microsoft SQL Server
4. IBM's OS/2 operating system
5. Hardware price/performance
6. Microsoft's Windows NT Advanced Server
7. Open systems
8. Off-the-shelf application
9. Unix
10. Proprietary program

For instance, Visual Basic does not include configuration management or version control features. Such capabilities become important when groups of programmers rather than individuals work on applications. Programmers often work with different iterations of an application. They need a central tracking system to insure that each programmer knows which version of a program is in use.

Though popular, Visual Basic and PowerBuilder are relatively new and not suited to all applications.

If that information is not available, problems can arise. A programmer may make a change or run a test on the wrong version of an application, leading the programmer to conclude that the application is bug free and clearing it for production. In such a situation, bugs could arise, users may enter improper information, and the company may spend a day or two cleaning up the problem.

THE POWER OF CHANGE. PowerBuilder includes better group programming functions than Visual Basic. Olson says one group of programmers at the state of Wisconsin use PowerBuilder rather than Visual Basic for those capabilities. Because PowerBuilder has a more object-oriented design than Visual Basic does, making changes is simpler.

Nichols Institute used PowerBuilder for an application supporting 25 users. (The institute's application was among those considered for the top 100 list.) Bob Pfister, the IS director at Nichols Institute, says PowerBuilder was much simpler to use than programming tools available on Digital Equipment Corp. VAX midrange systems.

Even though PowerBuilder is more intuitive than midrange system tools, it still has a learning curve. The Arizona Motor Vehicles Division, number six on our list of innovators, hired a consultant who had worked with PowerBuilder to help design its first few applications. "The consultant showed us a few shortcuts that speeded development," notes Jeffrey Wood, a systems architect for the state.

Though popular, Visual Basic and PowerBuilder are relatively new and not suited to all applications. With more complex applications, scalability can become an issue. Tools designed to work with a limited number of clients accessing one type of database cannot easily support applications running on many clients and accessing different databases.

Though Visual Basic and PowerBuilder received the most mentions by name, more companies cited GUI interfaces (led by Windows) and backbone/networking technologies (led by Novell Inc.'s NetWare) as the most important keys to a project's success from the client side. (See the accompanying table for the list of the top 10 products or technologies mentioned on both sides of projects.)

Focus on the options that are key to a specific project.

There is a wide range of tools available but choosing among the options can be difficult. Still, it's important to focus on the options that are key to a specific project, say the experts.

"A company has to pick one tool and focus all of its development effort on it," notes Dean Bymaster, vice president of systems at American Custom Insurance Services in Los Angeles, company number 92 on our list.

"If not, a corporation could get into a situation where programmers are working with new toys everyday. If that happens, programmers learn a lot about each tool, but the company will not complete its applications as quickly as it should."

— *Paul Korzeniowski*

#6

Arizona Motor Vehicles Division

$26 million investment will save $50 million a year

Today's rapid prototyping tools have been greeted with open arms, but having fast application builders is no replacement for careful planning.

"Most client/server projects are going to grow, so it's vital to pay careful attention to business planning, analysis, and design," says Tim Wolfe, a project director at the Arizona Motor Vehicles Division (MVD) in Phoenix, a division of the Arizona Department of Transportation. "Building new applications is the second step," Wolfe adds. "The first step is reengineering the processes themselves."

Thus, when Wolfe and his team of 70 developers decided to create new client/server systems to replace three aging applications on an Amdahl mainframe, they spent the first several months analyzing their needs and designing new process and data models. "We didn't want to automate just for the sake of automating," Wolfe explains. "We want a refined process."

MVD has three primary functions: driver licensing, vehicle title and registration, and taxation and licensing of the motor carrier industry. Each of these functions relies on a major system, built between 10 and 20 years ago, comprised of a separate IMS database application written in PL/1 for the mainframe.

ONE-STOP SOLUTION. The problem was that the three applications were not connected, which caused a lot of extra work for the MVD, Wolfe explains. For example, a change of address on a driver's license wouldn't simultaneously update the address in that individual's vehicle registration record. "Our aim was to centralize the vital statistics on each individual, and to completely rebuild all three systems into a single, integrated database," Wolfe says.

MVD began by creating detailed process and data models with KnowledgeWare Inc.'s Application Development Workbench (ADW). They used ADW to create the information strategy plan and for business area analysis, two phases of the information engineering process sometimes referred to as upper-CASE.

These analysis exercises gave the MVD a solid grasp of the existing processes as a starting point for reengineering those processes into client/server applications. "We created a business model which was used to discuss potential process improvements," Wolfe says. "ADW helped us document our analysis in a standard fashion."

An example of an improved process is Arizona's new extended drivers license, which is good from age 16 until age 60. Every 12 years, drivers are required to get a new photo, at their convenience, but the 12-year count will start over if they lose their license and have to come in for a replacement.

Project director Tim Wolfe worked with 70 developers to replace three aging Motor Vehicles Division applications that ran on an Amdahl mainframe.

Instead of taking photos with conventional film—which must be developed, laminated on the license, then mailed to the individual—the MVD will take the new photos digitally and print them instantly. Digital representations of the photos will be stored on the host so they can be easily accessed by other government agencies, such as law enforcement.

Project at a glance

Description
Reengineering of three essential business processes for the Motor Vehicles Division

Business benefit
Cost benefit of $50 million annually

Most surprising result
Lack of adequate tools, such as regression testing tools and software distribution tools

Advice
Don't pick your most mission-critical system first. Get your feet wet with an expendable system.

FEWER HASSLES FOR ALL. In the past, Arizona drivers had to come into the MVD once every four years to have their licenses renewed. Now, drivers with good driving records aren't required to come in at all, except for the 12-year photo updates. "They don't need the hassles and we don't need the extra work," Wolfe points out.

The Amdahl mainframe will still host the new applications, but 3270 terminals are being replaced with Compaq 486/33 workstations running OS/2. At each of its 60 offices, MVD has installed local area networks running IBM's LAN Server network operating system, with Compaq Proliant servers for local file and database storage.

> **Now, drivers with good driving records aren't required to come in at all, except for the 12-year photo updates. "They don't need the hassles and we don't need the extra work."**
>
> *Tim Wolfe*

Each office is connected to a WAN, which is, in turn, connected to the mainframe. The larger offices in major cities (Phoenix, Flagstaff, Tucson, and Prescott) have T1 links to the WAN, while smaller offices rely on 56K trunk lines to the major cities. The XDB database from XDB Inc. runs on the LANs for local data storage. If the WAN goes down, the offices can still function with this local database backup.

Under the new scheme, the customer record is preeminent. Even if you own three vehicles, are a licensed driver in Arizona, and have a commercial driver's license, you are still just a single customer in all of the databases. These types of database associations are best handled with relational technology, so the hierarchical IMS database was converted to DB2.

While high-level analysis and design activities were completed using KnowledgeWare's tools, a variety of products and tools are being used for development. KnowledgeWare's ADW and Intersolv's APS for lower-CASE design and construction, and the MicroFocus Development Workbench for graphical user interface construction.

$50 MILLION A YEAR. The department budgeted $26 million for the MVD project over a five-year period, but it expects an annual benefit of $50 million after the new systems are fully implemented: $33 million in enhanced revenue (made possible with new processes) and $17 million in cost avoidance as a result of more efficient processes.

"There isn't much sense to imposing a new technology on old methods," Wolfe concludes, reflecting on the successful completion of the first phase of the project. "You want to rethink the processes first. That means business analysis and planning, and having a set of high-level tools to structure the job." — *David Baum*

#7

Standard Commercial Corp.

Off the aging mainframe in just over 24 months

Three years ago, Standard Commercial Corp. decided to replace an aging IBM mainframe model 4341 at its Wilson, N.C., division with a network of PCs. "We wanted to build new corporate systems as quickly as possible so we could get out from under the expensive maintenance of the mainframe," recalls Dino Harrell, vice president in the corporate IS group at the $1.2 billion wool and tobacco firm.

In hindsight, Standard Commercial's plans were ambitious, Harrell admits. New applications would include order entry, purchasing, inventory, quality control, shipping, invoicing, and other corporate functions. And yet, they pulled it off — analyzed their information requirements, installed new hardware, software, and networking gear, and brought up their first client/server applications — all within a period of about 24 months.

"Some client/server projects never get off the ground because developers spend too much time trying to agree on nonessential items, such as user interface standards," Harrell says. "Sometimes you just have to say, 'Damn it, we're going to try this,' and jump in with both feet."

COBOL TRANSITION. Standard Commercial hired three programmers with PC experience to supplement the corporate IS group's skill base in Cobol, and brought in consultants to retrain six existing mainframe developers. "There was a strong will to succeed and a high synergy between the two groups," Harrell says. "Four out of six of our mainframe developers made a smooth shift to working with PC LAN technologies."

Standard Commercial's new and old staff members quickly learned to respect each other's experience. "The mainframe people had the business knowledge we needed, and the PC people had the technical know-how with the new tools," Harrell says.

With regard to technology selection, Standard Commercial played it by the book: Syhase Inc.'s SQL Server for database management and PowerSoft Corp.'s PowerBuilder for application development.

DOUGLAS ARLEDGE/IDG INTERNATIONAL

The team at the tobacco and wool company included new and veteran staff members, PC and mainframe programmers, working on an aggressive schedule so the mainframe could be sold.

"At the time, PowerBuilder was the strongest tool available for the type of client/server work we had in mind, which was Windows applications running on small to medium-sized local area networks accessing SQL databases," Harrell says. "For creating a Windows user interface on the fly, PowerBuilder is very fast and very complete."

Standard Commercial also liked the synergy between PowerBuilder and SQL Server, and the ability to make use of stored procedures to create server-oriented business logic. "Stored procedures keep developers from having to code the same logic over and over, since many front-end applications can access the same hack-end procedures," Harrell explains.

Because stored procedures can be called from client PCs, as well as from other stored procedures and triggers, they can be easily reused by many application functions. This serves to reduce the overall code in a system and simplify maintenance chores.

"If the SQL code is attached to PowerBuilder scripts on the client, it is not easily referenced or reused," Harrell continues. "But when the SQL syntax resides in stored procedures in Sybase SQL Server, you get the benefit of re-use and several other advantages."

LESS NETWORK ACTIVITY. Those advantages include better performance and less network activity, because the SQL syntax does not pass to the server when it is executed, Harrell adds. "A lot of the processing occurs at the server rather than the client, and you can centrally define referential integrity rules to act on the data," he adds.

All told, the company did 95 percent of the new development in PowerBuilder and about 5 percent in Microsoft's Visual Basic. However, if Standard Commercial was starting the project today, it would do a higher proportion of the work in Visual Basic, Harrell says. "Because PowerBuilder was designed to support many different back-end products, it doesn't run as efficiently as Visual Basic," he explains.

Today, the mainframe has been sold, and the first client/server applications are in production on a network of about one hundred 386 and 486 PC clones running Windows 3.1. Windows NT Advanced Server is the primary network operating system and Compaq Proliant 2000 servers support file-sharing activities and isolated tasks such as network faxing. The SQL Server database runs on Sun 630 Unix workstations under Sun OS.

MINIMIZING SUPPORT. Standard Commercial minimized support hassles by insisting on rigorous consistency in the types of client and server machines installed on the network and making sure they were all running the same versions of desktop and network operating system software.

"There are enough variables in any client/server development project without introducing these unnecessary ones," Harrell explains. "We quickly learned to maintain consistency wherever possible. If your users want to run spreadsheets, then standardize on one package, and keep them all upgraded to the same version. All clients should have the same autoexec.bat and config.sys settings, the same network interface cards, and so forth. Strive for homogeneity wherever possible."

—David Baum

Timeline

Summer 1990: Downsizing planning process begins

Spring 1991: Development of new client/server applications begins

Summer 1992: First client/server applications completed—rigorous testing begins

Summer 1993: All major client/server applications completed

Fall 1993: Mainframe sold

Project at a glance

Description
All systems running on the mainframe were replaced with LAN-based systems

Business benefit
Significant maintenance savings

Most surprising result
That there were fewer surprises than expected—it went very smoothly

Advice
Don't analyze the project to death, you'll never get it done.

Strive for a standardized hardware, software, and network environment.

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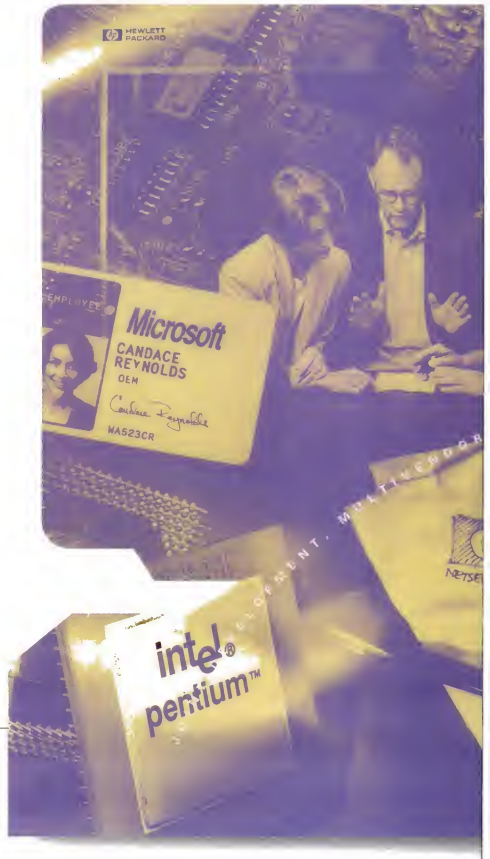

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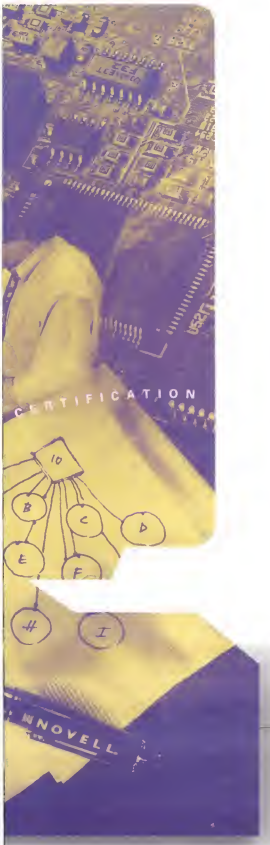

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#8

CCH Legal Information Services

How to play technology catch up on the desktop and win

Migration off CCH Legal Information Services' mainframe is being managed by Felix Santella (seated), vice president of information systems; Clyde Seigle (left), systems manager; and Mukesh Sehdal, project manager.

As the decade opened, few companies were further behind the desktop technology curve than CCH Legal Information Services (LIS). Reliant on lumbering mainframe systems running 3270 terminal emulators, the legal-services company, with 1,100 employees in 35 branches, had a grand total of three PCs in 1990.

When New York City-based LIS finally made its move to the desktop, however, it went all out. This fall, after doggedly staying the client/server course it charted four years ago, LIS will take the wraps off a system that was once considered undoable: It will run CICS transaction processing, formerly the bailiwick of glass-house mainframes, in a distributed Unix environment.

In 1990, with competitors eroding its market share, LIS knew it needed to shore up its business. "We realized we had gotten fat and lazy, and our customer base was being attacked by our competitors," says Felix Santella, vice president of information systems. Technology became a key part of LIS's plan to fight back. First, it would revamp its mainframe environment, which was as buttoned-down as its law-firm customers: The all-IBM platform ran CICS applications in a 3090 MVS environment. Rather than a wholesale replacement, LIS planned a methodical phase-out of the mainframe, removing functions one by one, carefully analyzing each step.

JUST IN TIME. In addition, LIS decided to enter the commercial-software arena. The Electronic Product Development (EPD) team's first assignment was a Windows-based just-in-time ordering system. Instead of the usual flurry of telephone calls and faxes required to order LIS's corporate, securities, and credit services, customers would use the software to get a real-time tap into LIS's mainframe server, placing orders with a mouse click and a few keystrokes. Processing time would plummet from two days to several minutes.

But outside the offices of the EPD team, LIS employees were working in the character-based past. They labored over the eye-boggling screens of 3270 emulators hitched to a less-than-reliable system. "The menu systems on the 3270 platform drove the organization crazy," says Santella. "We couldn't get invoices out, and when we did, they were inaccurate."

To provide relief and push the company closer to its distributed computing goal, MIS turned to the commercial program it had developed. By using the software's framework and recycling as much of the object-oriented C++ code as possible, it could economically move the data presentation off the mainframe, replacing the 3270-based applications with GUI applications. Over the next six months, five new modules were demonstrated to employees, who gave them thumbs up or down and added suggestions of their own.

Both the commercial and in-house programs were hits. After its April 1993 introduction, the commercial software—called CT Advantage—garnered industry awards and, more important, rave reviews from customers, with 1,100 signing up for the service within the first year. As for LIS employees, they took to the new graphical applications like pixels to the screen. Santella enthuses that CICS transaction monitors show the new system processes three times as much data as the legacy system did.

> **LIS knew it needed to shore up its business. "We realized we had gotten fat and lazy, and our customer base was being attacked by our competitors."**
>
> *Felix Santella*

RETIRING THE MAINFRAME. The IBM 3090 back-end server is slated for retirement at the end of this year. An evaluation of LAN-based servers found them too rickety for transaction processing, so LIS began working with IBM to migrate its transaction applications, written in CICS Cobol, to the RS/6000 running AIX, IBM's version of Unix. The Model 990 RISC workstation will act as the centralized data server and run CICS/6000 and DB2/6000, the downsized versions of Big Blue's ubiquitous OLTP and RDBMS.

Once the new host is in place, LIS will begin the next distribution step, farming out the remaining code and data to the 40 local environments and 800 users. Each branch office runs NetWare 3.12 and maintains a gateway into the company's WAN, which then connects to the host environment. Several smaller RS/6000s will function as communication servers.

Connectivity is complex. Because LIS bundles the communications software it uses with CT Advantage, "the cost is extremely important to us, and the goal is to keep costs down," says Mukesh Sehdal, project manager for the RS/6000 migration. Rather than incur the distribution fees of third-party packages, LIS found it more cost-effective to write its own code to support communications for internal and client programs.

"Rather than do a big-bang approach, take it slow," Santella advises client/server newcomers. The cost reductions LIS has realized attest to the soundness of its methodical approach: The move off of the 3270 emulators will slash $4 million from annual operating costs.

—Deborah Asbrand

Project at a glance

Description
A legal-services system for customers that was also adapted for internal use

Business benefit
$4 million annual operating cost savings

Most surprising result
Increased system usage by end-users. "There seems to be an excitement about the new application. With the old 3270 system, when we rolled it out, it took us two months to get them to use it. With this one, they're trying to log in at 7 a.m."

Advice
Don't do a big-bang approach. Take it slow. Plan to apply yourself: Client/server conversion requires lots of hours of effort.

#9

RMS Associates

End-users at NASA are the link between data and technology

By Paul Korzeniowski

RMS Associates, an outsourcing supplier operating the Center for AeroSpace Information (CASI) for NASA's Scientific and Technical Information (STI) division in Linthicum Heights, Md., sucked as much life out of the systems on two IBM 4381 mainframes as possible. For approximately 25 years, the mainframes supported 1,300 scientists and researchers as well as 150 internal users.

RMS Associates kept jerryrigging the systems to keep up with changes unimaginable 25 years ago. But the old gray systems were showing their age. "New requirements—such as full-text searching and video—were emerging, and our systems were simply not designed to support them," explains Chuck Walsh, the manager at RMS Associates' STI technology division.

In August 1991, RMS and NASA made the decision to trade the large systems for client/server computers. "We thought it would cost less to move to a client/server system compared to continually upgrading the mainframes," notes Roland Ridgeway, the acting head of information services at NASA's STI office. So, the agency embarked on a $500,000 upgrade project.

MILLIONS OF ABSTRACTS. NASA had uncommon requirements. CASI stores millions of abstracts from scientific journals, technical documents, and government publications. So the agency needed a database management system designed to work with bibliographical information. Few such systems are available, according to Walsh. The company chose BASISplus from Information Dimensions Inc. of Dublin, Ohio, as the package that best met the requirements.

That decision narrowed one piece of the client/server architecture: BASISplus ran only on Unix hardware. "At the time, OS/2 was our only other option but there were no bibliographical DBMSs designed for it," Walsh explains.

The selection process ended early in 1993 and RMS Associates began designing its applications. It expects to dump the mainframes by the end of 1995. A prototype bibliographic DBMS is running on one IBM server and a limited number of users are tinkering with it.

The transition to the new architecture has been dramatic. "A move to client/server is revolutionary rather than evolutionary for an organization," Walsh says. "Application design is different, prototyping is different, and problem solving is different."

The differences arise from how programs function. Mainframe programs generally operate in process mode and a programmer has control over the sequence of events followed. A graphical user interface hands that control to a user, who triggers events by pressing on an icon so the events can follow a variety of sequences. This makes programming and testing GUI applications much different—and in most cases more challenging—than mainframe applications.

ROBERT ZUCKERMAN/IDG INTERNATIONAL

Users such as Gail Hodge are leading projects designed by RMS Associates, a contractor that manages technology projects for NASA's Center for AeroSpace Information.

USERS LEAD THE WAY. Walsh says GUIs can be a blessing as well as a curse. They provide organizations with more application design options, but program design becomes more complex and mistakes are easier to make. So RMS Associates overhauled its application design process.

In mainframe development, end-users talk to programmers, who then go to their cubicles, bang away at their keyboards, and return with programs they think the users desire.

Client/server programming is more interactive. The programmer develops more of a working outline that the user fills in. So, users have more say in how applications are designed. In some cases, such as those based on report writers, users can do most of the programming work.

Consequently, end-users have to take on more leadership. "We have users rather than data processing professionals as team leaders," he says. "In order for an application to be successful, end-users have to drive development." Gail Hodge, a user, is the RMS project manager on the bibliographic project.

In addition to the bibliographical data, the division plans to migrate its daily business applications, such as office automation and accounts receivable, to client/server systems. RMS Associates examined distributed DBMSs and selected Oracle Corp.'s Oracle DBMS, which it plans to run on IBM AIX servers. The company also realized that users needed horsepower to run the new applications, so it supplied every user with at least a 486-based system. Also, the company had been using NetWare to support LAN operations and is adding TCP/IP support to each PC they can access the Unix servers.

MIXING AND MATCHING. The new client/server design offers RMS more flexibility in selecting equipment. But

> **"New requirements were emerging and our systems were simply not designed to support them."**
>
> *Chuck Walsh*

Walsh found that mixing and matching different computers can be complicated. "Open system products are not really plug and play," he notes. "Two products may support a standard but do it a slightly different way. So, connecting them can be difficult."

The rapidly changing pace of client/server programming has been bust and a boon. On the downside, new products can stifle development. "We are constantly trying to decide whether to wait six months for a new release or proceed with what is available," Walsh says.

On the plus side, companies are able to build more sophisticated applications. Notes Walsh: "We are including features now that we did not think we were possible a year or two ago."

Project at a glance

Description
Move bibliographic DBMS plus general business applications off of a mainframe

Business benefit
The ability to use emerging technologies

Most surprising result
The speed of technology change

Advice
Be prepared for technical revolution, not simple evolution.

Let the users take more control over application design.

Don't rely on mainframe program development techniques: revamp your application development system.

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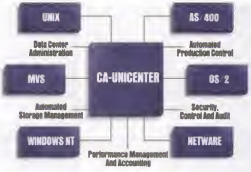

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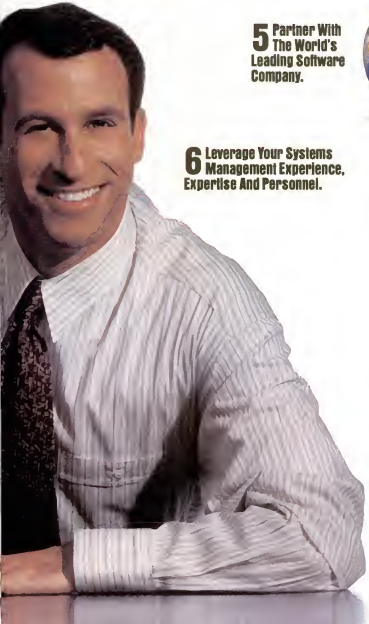

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#10

Office of the Assistant Secretary of Defense for Reserve Affairs

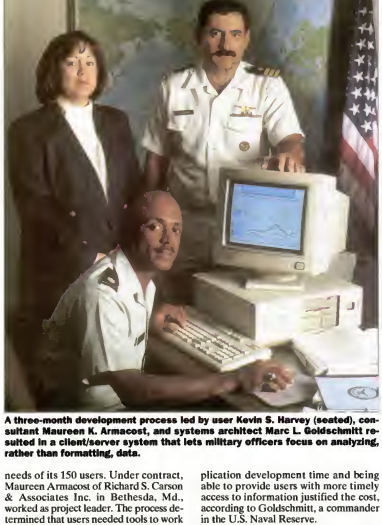
Department of Defense goes on the offense with client/server

Two years ago, Kevin S. Harvey, a lieutenant colonel in the U.S. Army National Guard, became the deputy director of readiness at the Office of the Assistant Secretary of Defense for Reserve Affairs at the Pentagon in Washington, D.C. Each quarter, he would spend two weeks of long days preparing a series of high-level reports. The time was needed to pull data stored in a variety of proprietary computer systems and change it into a format for analysis by various officials.

Now, Harvey generates the quarterly reports in approximately two hours and spends the extra time analyzing the information. The time savings are the result of an overhaul of the computer systems throughout the office. Gone are stand-alone DOS systems and proprietary CTOS (Convergent Technologies Operating System) computers; arriving are PCs running Windows and NetWare servers. Rather than sift through complex series of paper reports, officers now manipulate computer screen data with Arbor Software Inc.'s Essbase and Pilot Inc.'s Lightship data analysis tools.

The overhaul began in September 1992 when the office determined the old systems had outlived their usefulness. "Our top officers analyze information and make decisions," explains Marc L. Goldschmitt, the deputy director of data integration and communication systems for the assistant secretary of defense. "They were spending too much time accessing and formatting data related to reserve affairs rather than analyzing it."

THREE MONTHS OF EVALUATION. After a comprehensive requirements analysis was completed, the office began a three-month evaluation to determine which products would best address the needs of its 150 users. Under contract, Maureen Armacost of Richard S. Carson & Associates Inc. in Bethesda, Md., worked as project leader. The process determined that users needed tools to work with two types of data: structured and unstructured.



ADAM LAUFER INTERNATIONAL

A three-month development process led by user Kevin S. Harvey (seated), consultant Maureen K. Armacost, and systems architect Marc L. Goldschmitt resulted in a client/server system that lets military officers focus on analyzing, rather than formatting, data.

The structured data was stored in files and database management systems. The office examined different tools before selecting Essbase and Lightship to examine numeric information. The unstructured information analyzed by users included documents and images. Lotus Development Corp.'s Notes was chosen as the primary tool to manage the unstructured data.

In addition, the office has begun evaluating workflow and text retrieval systems. It expects to select products by the end of the year and build applications next year.

The reengineering has a price tag of approximately six staff years. A cut in application development time and being able to provide users with more timely access to information justified the cost, according to Goldschmitt, a commander in the U.S. Naval Reserve.

The application development savings have indeed been dramatic. Revamping one structured application would have required four to five staff years on the old system. Using desktop and network tools, the office completed the process in nine months.

Adding to the current infrastructure is simple. One application, which cost only one staff month to complete, replaced five separate applications that had taken nearly two staff years to develop.

BENEFITS FOR ALL. End-users endorse the change. In addition to time savings by employees such as Harvey, there are other benefits, such as a common user application interface. "I can walk into any office and start using the desktop computer right away," notes Harvey.

The interface is simple enough for novices. "We used to spend weeks training personnel to run our applications," Goldschmitt says. "Now, we have them working in a couple of days or in some cases a few hours."

The interface is rich enough for experienced users. "Our more seasoned users can tailor the system to provide more detailed analysis of information that interests them," Goldschmitt said.

While the project has benefits, the office encountered managerial and technical challenges. On the management side, the office must entice users to alter work habits. Stand-alone applications, such as word processing packages, are being replaced by integrated tools that save time by performing tasks, such as automatically mailing, routing, coordinating, and tracking a memo.

SLUGGISH NOTES. Client/server technology also presents problems. Max Hernandez, assistant director for network operations and a lieutenant colonel in the U.S. Air Force, explains that the department uses Notes to track actions and update information shared among users. At first, the performance of Notes running on IBM OS/2 operating system was sluggish. The office solved that problem by moving to a NetWare Loadable Module version of Notes.

The office still has a few applications that run under Microsoft's MS-DOS operating system. In a few cases, users did not have sufficient memory to run the application as well as the ancillary software needed for the new network and applications.

The organization tinkered with its PCs to ensure the older applications run. "When implementing new technology, you cannot take anything away that a user thinks is beneficial," Goldschmitt notes. "You have to enhance his productivity not diminish it."

Network and system management has been an ongoing concern and pinpointing a problem's source has been a challenge. "Error messages would often point to the wrong problem," Goldschmitt explains. "We would think there was a problem with application software but it would turn out to be a faulty printer driver."

The office has been gaining experience from each problem and constructing a manual that steps network technicians through common issues. In addition to learning from the challenges, the office is building on new opportunities. It's a never-ending process, says Goldschmitt. "We'll always be making improvements to both processes and systems. As soon as one improvement is implemented, users tell of us of another that is needed."

— Paul Korzeniowski

Project at a glance

Description
Replace a labor-intensive analysis system and proprietary office systems with PCs and LANs

Business benefit
Putting better information in the hands of end-users

Most surprising result
Technically, how frequently vendors update their products, which causes configuration management issues. How difficult it is to sell users on the benefits of client/server before installation, but how quickly they take to it once it's running.

Advice
Develop techniques to identify the source of network and application problems.

Don't become immersed in technology. Make the user's life simpler, not more complex.

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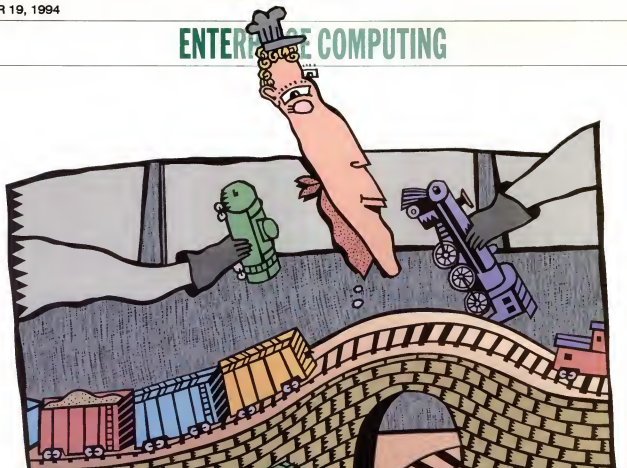

The new client/server model

Tools that let you put operations where they belong are just around the bend

BY DAVID BAUM

Early designers of client/server applications had a fairly standard formula to follow: put a robust database on the server to drive the fancy graphical user interface and application logic. Two-tiered and logical, this formula worked for many early client/server architects.

But what happens to the application when the server is changed? Maybe it is split across two machines to improve performance, or maybe it is upgraded. The application logic, now residing on countless PCs, has to be changed to find the appropriate data. What happens if business rules change, such as the sales tax on a customer order entry application? And does this database-centric view of the system apply to client/server applications that are not database oriented?

Now the two-tiered structure is not a simple, elegant solution but a rigid system that makes modifications difficult at best. And worse, it fails to take advantage of the real power of client/server processing: distributing operations across the LAN.

The solution is to partition or divide applications across systems in a more discriminating fashion. Where there is a problem, there will soon be a buzzword: Application partitioning is entering the client/server lexicon.

"Application partitioning means taking the three primary portions of an app — data management, application logic, and presentation — and distributing them across multiple platforms and locations in an optimal fashion," says John Doucette, vice president of corporate services and information services at Bay State Gas in Westborough, Mass.

That's easy enough to say, and even conceptualize. Coding it is another matter. Thankfully, a new generation of client/server tools promises to automate the partitioning decisions. Using objects, the development tool decides for itself what part of the code runs where and under what circumstances.

NEW VISION. Forget for a moment the preconceptions about client/server and consider the fundamentals. Forget about clients as powerful PCs with flashy user interfaces. Forget about servers as large data repositories with the task of storing data and serving files. Forget about mainframes as archaic, overpowered machines supporting dumb terminals.

The central idea behind client/server computing is the distribution of processing. Instead of a host-based application architecture, where all the power rests centrally within a mainframe computer, the thrust behind client/server is to divide, or partition, application functions among multiple processors to put the processing on the right machine for the job at hand.

Products that support this vision are now coming to market. Relying on object-oriented foundations, these tools provide greater flexibility for dividing applications among clients and servers, as well as better integration among all computing platforms.

"Many of our first-generation client/server development tools are really client-only development tools," says Judith Hurwitz, an analyst with the Hurwitz Consulting Group in Watertown, Mass. "They excel at building the graphical, front-end portions of an application, but the client/server network connections and all server activities are handled by the facilities of a server-based RDBMS."

In this type of architecture, application logic resides entirely on the client, and database activity is controlled by relational database management system (RDBMS) stored procedures on one or more server nodes. Complex relational database functions, such as an inventory debit that also triggers an order entry transaction, must be coded using those procedures.

RUNNING ON TIME. When operations must be performed many times by many applications, stored procedures are a conve-

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niency may to centrally define the processing that must be done. But their use is generally restricted to smaller applications with fewer users, Hurwitz says.

"For larger applications, you often want to balance the processing load among several servers, which means, ideally, having an environment that allows more control on the server end," she adds.

For example, in the SAS fourth-generation language (4GL) development environment, server platforms are not only data servers, but also application servers. Different partitions of an application, or sessions, can run on both clients and servers in a cooperative, peer-to-peer fashion.

"Once you establish a connection between a client and a server, you can decide which session does what, where, and when," explains John McIntyre, program manager for enterprise computing at SAS Institute in Cary, N.C. "This can include anything from simply fetching data from the server to running complicated logic, such as performing a credit check or updating a shipping schedule."

SAS, which has been shipping its development tools since 1987, also allows developers to create the same type of application logic on many different client and server nodes using the SAS 4GL. Other high-end 4GLs offer similar flexibility, including Unifasce Corp.'s Unifasce, Information Builders Inc.'s Focus, and Progress Software Corp.'s Progress 7.

"Unlike the mainframe world, where the entire application resides on one computer, client/server seeks to divide the presentation layer, the logical layer, and the database," Doucette explains. "The trick is figuring out how to optimally partition these application components across multiple platforms."

Doucette and his colleagues turned to Progress 7 for help, partly because of its capability to easily partition a database across multiple servers. The utility company, which supplies natural and propane gas to residential, commercial, and large industrial customers throughout New England, is now involved in a downsizing project in which key customer service applications are being moved from a Unisys A-Series mainframe to several distributed Hewlett-Packard Co. 9000 minicomputers running Unix.

"Progress has an architecture that is ideal for exploiting the capabilities of multiple servers in a network," Doucette says. "Our offices are distributed among various service areas, and being able to partition customer data among servers — all accessed by the same application — was a key feature." An integrated relational database within the Progress environment makes for a tight coupling of database and application-oriented logic, all controlled with the Progress 4GL, Doucette adds.

NO TRANSFERS ALLOWED. The only problem with this type of application architecture is that the partitions are hard-coded for a particular physical configuration of nodes. The pieces are connected by 4GL subroutine calls, remote procedure calls, and good old third-generation language (3GL) code. This makes it difficult to repartition the application as the business needs change.

"How does the application know where to look once you move the database from one server to another?" Doucette asks. "How does it react if you take a database that was once on one server and divide it up between two?" Typically, such changes involve rewriting application calls and, in some cases, recompiling the application, he says.

Although companies' distributed applications are successful, today's client/server development tools still force developers to rewrite key portions of the code whenever a new partitioning scheme is established.

"When it comes to moving some functionality that was once designated for a client to later run on a server, things can get complicated," Hurwitz says. "In some cases, it means a whole new modeling effort. In others, it can mean a rewrite and recompilation of the application code."

The reason for this is that most people view client/server with a very databasecentric model in mind, says Paul Butterworth, vice president of engineering at Forte Software Inc., in Oakland, Calif.

"There is the display logic, the application logic, and the database server logic," Butterworth says. "The issue, so far anyway, has been to determine how much goes on each piece."

But in some cases, there doesn't need to be a database at all, such as with an application that monitors a stock feed and simply notifies another process in the network when certain events occur. In other cases, there doesn't have to be a client or even a user involved.

THE THREE-TIERED APPROACH. For these reasons, Forte approaches the client/ server partitioning problem more generally with its Forte development environment, an object-oriented development tool due this month. Forte decouples development of an application's functionality from the process of partitioning that functionality. Application objects can be divided up simply by dragging and dropping icons. After an application has been logically defined, it can be split into separate partitions that execute on different machines in the network. The application can later be repartitioned for other environments, as requirements change and evolve, without changing the logical definition.

Other development tools that take a similar approach are starting to hit the market, such as Cognos Corp.'s Axiant, Bachman Information Systems Inc.'s Ellipse, and Sapiens USA Inc.'s Ideo. These tools take a less literal view of what a client is and what a server is, viewing applications as a set of logical domains that can be moved around the network at will.

These tools let the developer create an application that better mirrors the business process rather than one that is tied to an abstraction of where the data resides. Forte divides applications into three tiers: clients, data, and shared application services. The client (or presentation) tier is the part of the application that sits on the user's desktop. The data tier represents one or more sources of data, just as today's servers do, but it can also be an electronic source such as a news feed or a real-time process controller.

The third tier — application services — is what makes Forte different from older client/server tools. It is a set of sharable, multitasking components that interacts with clients as well as other "peer" services and data sources.

These middle-tier services can enforce business policies, keep other peer services informed of changes, and notify users of important events that they might be interested in, Butterworth says. Although the simpler, two-tiered client/server tools can support the type of three-tiered application architecture they must rely on external languages and tools to build all the pieces. The client portion might be constructed with the client/server development environment's tools. The server logic might be a combination of 4GL code and database-dependent stored procedures. And the shared application service, if any, might be created with old 3GL code.

Ideally, you should be able to build the entire application within a single, integrated application-development environment," Butterworth says. "Then, when it comes time to scale or repartition the application, it can all be done at a logical level, and a new physical configuration can be generated automatically."

EVENTS OUT, OBJECTS IN. Another notion that is falling by the wayside in the client/server industry is the pre-eminence of "event-driven" applications. In the event-driven model, the client initiates an activity and the server responds. The idea is to empower users, so they can take control of the flow of the application. But the event-driven model has proved to be restrictive, particularly where partitioning application logic is concerned.

Today's object-oriented development tools, such as IntelliCorp Inc.'s Kappa and Inference Corp.'s ArtEnterprise, allow any object in the network to signal the occurrence of an event for which other objects want to receive notification. Some developers now call these business events, and they can include events generated by GUIs, events from independently running processes, events from timers, and events from system tasks, to name a few.

For example, a company wants to ensure that high-priority customers won't be kept waiting on the phone for more than 20 seconds. With most of today's client/server tools, there are two ways to achieve this. Either force the user to press a key every 20 seconds to check the call-waiting queue, or have the application continually poll the database to determine if there are high-priority calls holding.

But Forte uses two simple 4GL statements to set up any type of application event, Butterworth says — "post" and "when". The "post" statement allows an object to signal an event and pass along data values. The "when" statement allows an object to receive and handle the events and, if necessary, respond to another object.

INTO THE STATION. Although application partitioning promises to ease client/ server development, it is a new concept with its share of detractors. A poor performing application might require some additional hardware, some suggest. Managing objects and their various partitions is also a tricky challenge, says International Data Corp. analyst Brent Williams. "They demand a high degree of control over the deployed application."

Even Forte officials concede that application partitioning is no panacea. These techniques may be appealing for new development, but existing applications may require old-fashioned coding. As with all things client/server, the final decisions will probably hold some old and some new technologies. ❑

David Baum is a freelance writer in Santa Barbara, Calif., specializing in application development issues. Scott Mace contributed to this article.

The mainframe freight

Many organizations have decommissioned their mainframes as a result of moving into a client/server environment. But for others, the client/server platform has — out of expediency or necessity — co-existed with the mainframe. Indeed, client/server computing has driven demand for new types of access to mainframe data, albeit at arm's length. For the most part, integration consists of simple access via gateways.

"Gateways for legacy data will one day disappear," predicts David McGoveran, a database consultant, in Boulder Creek, Calif. "Ultimately, we must build applications that can be moved at will among the best platforms and processors. You can't be in the mode of emulating your new and old systems forever. In that sense, gateways are a stop-gap measure."

Newer client/server development tools are beginning to provide a mechanism for partitioning application logic among LAN-based PCs, workstations, midrange platforms, and mainframe computers. IBM's Smalltalk language and Visual Age application development environment, announced earlier this year, are examples. Eventually, says Scott Baxter, IBM's manager of application development strategy in Cary, N.C., you'll be able to construct Smalltalk applications with logic distributed among personal computers, Unix systems, midrange systems such as the AS/400, and even mainframes.

IBM's System Object Model (SOM) and Distributed System Object Model (DSOM) will enable object-to-object messaging across the network.

But analysts and users are still looking for clarification on just how SOM and DSOM will come into play.

Meanwhile, Sapiens USA Inc. has introduced its ObjectPool strategy, which aims to make mainframe data stores easily accessible to LAN-based client/server applications. Objects in the Sapiens ObjectPool can initiate complex updates as a result of requests sent from the client application, explains Mike Zion, an executive vice president with the firm.

For example, a SQL INSERT statement from a front-end Ideo application to a local database on the LAN could automatically trigger a rule stored in the ObjectPool associated with a mainframe table, such as:

```
SUBTRACT QUANTITY ORDERED FROM
QUANTITY ON HAND.
```

Ideo translates SQL statements into ObjectPool messages, which trigger the mainframe objects, Dion says.

"Objects can be developed on one platform and then moved to other platforms that support the same collection of objects, without regard to whether those platforms are 'clients' or 'servers,' but simply processors in the network optimized for certain types of tasks," he adds.

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Link systems to business goals

Client/server project funding can be easier to find if business management understands the advantages

BY EMILY LEINFUSS

There is good news and bad news in the way IS justifies the move to client/server systems. The bad news is that client/server is more expensive to implement than earlier assessments estimated. The good news is that management approves funding for client/server projects when IS can present a business reason for the project.

"You cannot just say, 'This is wonderful technology.' You cannot even say that it costs less. It has to be justified for business reasons," says Roger Rudenstein, project leader in the MIS department at Continental Grain Co., in New York. Reengineering business processes and achieving greater efficiency were the justifications for moving to a client/server application in the human resources department. The firm implemented HR and payroll software from PeopleSoft Inc., in Walnut Creek, Calif. In this case, he says the old system was time-consuming, not cost-effective, and didn't provide enough end-user functionality.

IS managers are using three arguments to justify the move to client/server, according to Ken Dec, research director of IT management at the Gartner Group, a Stamford, Conn.-based consultancy:

- Improved customer service;
- Empowered employees; and
- Re-engineered business processes.

Those are justifications, but IS executives and consultants warn that to succeed, they must be tightly coupled to both corporate and IS strategies.

"When rationalizing the migration to client/server from host-based architectures, the first thing to do is combine the project with an effort to re-engineer the mainline or critical business processes," says Christopher Moffitt, director of information systems delivery practice at Diamond Technology Partners Inc., a Chicago-area consulting group.

In addition, a client/server system should be part of a comprehensive systems architecture that includes mainframe, midrange, and PC platforms and puts the application where it is most appropriate.

"Often, integrating mainframe or legacy systems as part of a client/server system makes the most sense," Dec says.

Improved customer service was the justification for and the result of a recent overhaul of the worldwide reservation system for Holiday Inn, based in Atlanta. The new system, called Herman, supports access to mainframe transaction processing and access to decision-support processing on the local server, says Leanne Langdon, director of operations and finance.

Langdon justified the move to a GUI, local processing environment in two ways. The first way was tactical: to gain in operational savings in call handling for reservations. The second was strategic: to force re-engineering of an outdated, hard-to-maintain system developed in the 1970s. Holiday Inn used MitemView, a message-oriented middleware product from Mitem Corp., in Sudbury, Mass. MitemView provides a GUI front end to mainframe systems and allows migration at the back end to client/server with the mainframe or PCs as servers.

Empowered employees was the main justification for a client/server project at Lincoln National Corp., a Fort Wayne, Ind., insurance and financial services firm. "We wanted to give end-users the ability to do local calculations so they could perform analysis on information, not just process data," says Bob Malik, senior vice president and CIO.

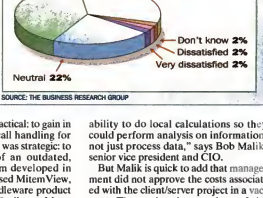
But Malik is quick to add that management did not approve the costs associated with the client/server project in a vacuum. The project is one piece of the company's new information system that includes the mainframe platform, client/server local processing, and networks.

"We support these three computing strategies, and put applications where they are most appropriate," Malik says.

Emily Leinfuss is a freelance writer in Sarasota, Fla.

New systems cost more, satisfy more

More than 70 percent of IS managers say they are satisfied with the cost of computing after rightsizing systems



SOURCE: THE BUSINESS RESEARCH GROUP

Manager's Bulletin Board

Remember the IS fundamentals. Like sports celebrities who forget to practice, IS shops are forgetting to follow well-honed principles for implementing new systems. That's the conclusion of a 16-page white paper from Computer Sciences Corp. Consulting titled "Large-Scale IS Project Management: Avoiding Disaster by Attending to Fundamentals." Large projects — such as the Denver Airport's baggage-handling system — are failing not because the technology doesn't deliver or because organizations are using radically new methodologies such as object orientation. The author, Erwin Martinez, says projects will succeed if IS management documents the business vision, seeks proper funding and staffing, installs project management software, and establishes both teams and managers responsible for the success of different components of the project. The white paper is available at no charge from CSC. Call Christine Lagasse at (617) 647-0116, ext. 4083.

Object lessons. IS executives interested in unearthing the mysteries of object-oriented technology might want to check out the free half-day seminars sponsored by Next Inc. starting in two weeks. The "Object Lessons," which will be held in 12 cities over the next three months, will include an introduction to object technology, case studies of companies that have successfully deployed Next's NextStep software, and hands-on demonstrations of NextStep applications. For the date and location of the seminar in your area, call (800) TRY-NEXT.

Downsizing JC Penney's warehouses. Turning to Unix servers from Hewlett-Packard Co., retailing giant JC Penney Company Inc. recently put the finishing touches on an overhaul of its mainframe-based warehousing and distribution system. This system, which used to rely on paper forms and a remote job-entry and batch-processing application running on an Amdahl mainframe, now features three HP 9000 business servers (valued at $1.5 million), software from McHugh, Freeman & Associates Inc., and radio-frequency technology from Symbol Technology Inc. and Connect Inc.

Employees at three JC Penney facilities can now manage with far greater efficiency and accuracy the storage and distribution of more than 40 million cartons of merchandise handled every year.

Who is buying whom?

Software transactions in the first half of 1994

Acquiring company	Acquired company	Acquisition price (in millions)
Novell Inc.	WordPerfect Corp.	$855
Adobe Systems Inc.	Aldus Corp.	$411
Computer Associates International Inc.	The Ask Group	$312
Novell Inc.	Borland International Inc. (Quattro Pro)	$145
Microsoft Corp.	Soft Image	$130

Calendar

SEPTEMBER

24-28 ABUI Fall Conference and Banyan Developers Conference, Providence, R.I. Contact Enterprise Applications Symposium, (800) 730-2284.

26-28 Information Superhighway Summit, San Jose, Calif. Contact IDG World Expo, (508) 879-6700.

OCTOBER

3-7 Software Development '94 East, Washington. Contact Miller Freeman Inc., (415) 905-2784.

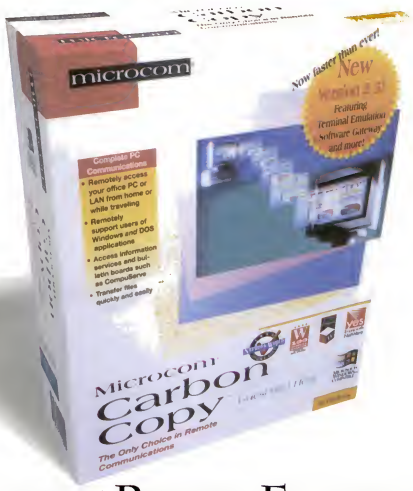
4-6 Unix Expo '94, New York. Contact Bruno Blenheim, (800) 829-3976.

4-8 Software Publishers Association annual conference, Dallas. Contact the SPA, (202) 452-1600.

10-13 AEC Systems, fall, (held in conjunction with Computers for Contractors '94), Chicago. Contact AEC Systems, (800) 451-1196.

11-13 Interchange '94, held in conjunction with GovCom '94, Washington. Contact Reed Exhibition Companies, (800) 7GOVCOM.

18-19 Multimedia: The Route to Tomorrow ComForum, Denver. Contact the International Engineering Consortium, (312) 938-8787.



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Case Study

AT&T uses CAD tools to streamline cellular design

Programs let lab answer the call for durable phones without putting the process on hold

BY LORI VALIGRA

Designing a tiny, sleek cellular telephone worthy of appearing in The Sharper Image catalog may be an engineer's dream challenge. But as engineer John Clarke and his colleagues at AT&T's Wireless Communications Laboratory, in Holmdel, N.J., well know, the challenge could just as easily be a nightmare.

Building a cellular phone is a logistical battle. Each telephone has more than 600 parts, many of which form complex interrelationships. Changing the location of one part, even minutely, sets off a chain reaction of changes that affect how the phone's parts fit together.

Additionally, the cellular phone market is highly competitive. Models have a short one-to-two-year life span, and prices and product sizes shrink rapidly from model to model.

Clarke and his colleagues have to not only design phones quickly and avoid mistakes, but build phones to last — customers drop phones or store them in car trunks where they are exposed to extreme summer and winter temperatures.

The CAD tools are saving AT&T several months in cellular phone design time and make engineering checks more accurate, says engineer John Clarke.

A CLEAR CASE FOR CAD. To meet these unique challenges, the AT&T engineers knew they would need sophisticated, flexible CAD tools for both the mechanical and electrical sides of phone design.

For the former, which includes the phone housing, battery packs, and keypad, they chose Pro/Engineer, a mechanical CAD program from Parametric Technology Corp., in Waltham, Mass. For the electrical components, they chose Dazix, a software package from Intergraph Corp., in Huntsville, Ala. Both programs run on Sun Microsystems Inc. Sparcstation 10 workstations that are linked in an AT&T StarLAN network.

A key component of Pro/Engineer is its capability to accept changes at any point in the design cycle. And because the CAD system is also associative, a change to one part will update the mating parts, assemblies, drawings, and mold designs and machining paths for manufacturing.

For example, in a telephone design, the dial pad buttons would typically be the same size, and each would fit into the phone housing with the same clearance between its edges and the opening in the housing. With Pro/Engineer, a single button can be created and then duplicated to form the entire dial pad.

If a change in button size is needed later in the design, only the original button size would need to be modified; all the other buttons would automatically be changed, as would the size of the button holes in the housing so the needed clearance is maintained.

"If we make one change, we do not have to remember to make all the rest of the changes related to it," explains Dhiren Patel, a mechanical engineer at the lab. "Very few CAD packages do this."

PHOTOS BY MICHAEL COFFEY / DOMAS LOKOS

When changes are needed on a design, mechanical engineer Dhiren Patel appreciates how rapidly and thoroughly Pro/Engineer handles any modifications.

WORKING IN TANDEM. Precision marks the cellular telephone engineering process from the very beginning. After Clarke and Patel receive a list of specifications from AT&T's marketing department, they determine the preliminary dimensions for the new phone, including space for the keypad and batteries.

Those dimensions then go to the industrial design team for additional refinement, before returning to two teams of engineers — the mechanical engineers begin work on the housing while the electrical engineers labor on the internal electronics.

The industrial design has traditionally been given to engineering as a paper drawing defining the outside shape of the phone, although there is a movement to get the data sent as a CAD file to speed up the process, Clarke says.

"[The design] does not address how many parts it will take to make the housing, how the pieces will be held together, or even whether the shape is easily manufacturable," Clarke continues.

This means the mechanical engineers must recreate the outside surfaces using Pro/Engineer, and then begin the internal design of the phone housing. They must decide what materials will be used, how thick the plastic housing should be, whether the phone will be held together with screws or plastic snaps, and what kind of internal ribs are needed for structural strength.

The mechanical engineers also need to communicate often and clearly with the electrical engineers on the team.

"A lot of give and take is required to make sure that there will be adequate clearance between the internal structure of the phone housing and the electrical components mounted on the circuit board," Clarke says.

To keep this communication flowing as smoothly as possible, AT&T and Intergraph recently co-developed a bidirectional interface between Dazix software and Pro/Engineer.

This interface allows the lab's engineers to bring an electrical board design created in Dazix into a preliminary Pro/Engineer plastic design file in a three-dimensional format.

"We can marry the two together and look at the actual phone on a screen, rotate it, and look inside the phone assembly by creating cross-sectional views to measure clearances," Clarke says. If either of the designs doesn't properly fit the other, a modification can be made at that point.

"If we had to wait for physical models to come back and then make the modifications, we could lose weeks," he adds. Clarke says the CAD tools save AT&T a couple of months in development time for a phone, and the engineering checks are more accurate.

NOT QUITE PERFECT. AT&T's lab is also trying to save time and money by developing CAD platforms — boilerplate designs of certain segments of a phone, such as electromagnetic interference shielding — that can be reused from one product to the next.

"We are developing the platforms in both the electrical and mechanical designs with the intent of reusing them in future product lines," says electrical engineer Joe Gangemi. "The more we can reuse, the shorter the design time is for the new phone."

Although Clarke says the power of CAD tools allows engineers to make higher quality products with shorter design cycles, a critical piece of software is still missing in phone design — a package that allows simulated drop testing of a completed telephone.

AT&T's engineers can get prototype plastic parts built quickly, but these parts cannot be used for structural testing of the phone because they don't have the same mechanical properties as the final injection-molded housings.

This means structural testing, such as a drop test, can only be done late in the design cycle of the phone, just a few weeks before production starts. If design changes need to be made to improve a part's strength, they're very costly and could delay the start of the phone's production.

Clarke has been searching for a software tool that would allow the engineers to do a simulated drop test, much like the simulated phone assembly the team can do now with the CAD system. Although he has talked to several vendors about such a tool, so far his search has come up empty.

Despite the advantages that computers bring to AT&T's cellular phone design process, whether or not the resulting telephone ever makes it to market still relies just a bit on luck.

"You do as much analysis up front and use as much good judgment as you can when you're doing the design, but you always have to keep your fingers crossed when you do the drop test," Clarke concludes. ❑

Lori Valigra is a Cambridge, Mass., writer who frequently covers networking technology.

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Stewart Alsop, Editor-in-Chief, InfoWorld, *May 16, 1994, p.102.*

INFO WORLD

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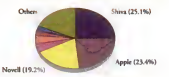

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PC Magazine, *August 1994, p.317.**

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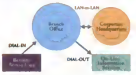

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Network Curmudgeon / David Strom

I'm not sure you should try this at home, let alone a museum

Installing Novell Inc.'s GroupWise at the Guggenheim Museum proved that experience teaches you to look for what you don't know. The only problem is that I only just gained that experience.

To recap, last week I started my new installation and testing journeys at the Guggenheim Museum in New York. The museum is trying to improve communications between its uptown and downtown sites by installing GroupWise E-mail and scheduling software from Novell' WordPerfect Group.

We learned many lessons in the process. First off, our timing was lousy, and if we had it all to do again, we would wait a month before starting. We did the tests in mid to late August, close to scheduled vacations for the Guggenheim guys and about the time WordPerfect was finishing up the beta of GroupWise 4.0. (A final version began shipping at the end of August.) Consequently, manuals weren't ready and the software was still in flux.

This was frustrating for the Guggenheim and WordPerfect staffs. Just when we thought we were ready to start, we discovered that the disk package was incomplete; WordPerfect sent the missing pieces overnight and had us download software from the bulletin board.

You might not have these problems — but you'll have other scheduling nightmares.

Second, I am still amazed at the shockingly high number of pieces needed to assemble an enterprise E-mail system using GroupWise (see chart). Figuring out what to buy, let alone how it gets configured, takes some time and study.

It would really help if WordPerfect would package all GroupWise components on a single CD-ROM with various unlock keys, similar to Softbank's software smorgasbords, and include an electronic copy of all manuals.

Third, there is no getting around the fact that GroupWise is a difficult product to install: You'll have to put in lots of time planning, testing, and gathering information. WordPerfect claims that a single post office can be installed by a novice in 2 hours — it took a team of three experienced people close to two weeks.

WordPerfect provides numerous manuals, white papers, checklists, and README files, but none provided a clear way of seeing the big picture. Take the README files. Each piece (such as the Windows client, DOS client, Message Handling Service gateway, and so on) has its own files, and some are duplicates of others. Using Norton's FileFind, from Symantec Corp., we managed to smoke out most of the README files on the server after they had been installed.

Dealing with all this nonsense, I found myself getting easily confused — despite the fact that I've installed both Lotus Development Corp.'s cc:Mail and Microsoft's Mail systems from scratch.

Fourth, the unexpected installed base represented a variety of less-than-current systems. The museum — underfunded and understaffed — is still mostly a DOS shop and hasn't upgraded to more recent versions of NetWare or WordPerfect because the older versions are adequate.

The only thing that had to be upgraded for the project was the existing Microsoft Office 3.1 mail database, which was being used by the IS department. This conversion took most of a work day, as we moved close to 8,000 messages, or about 1,000 messages an hour. Converting each message one-by-one is a slow process. We forgot to run CHKOFF to weed out deleted messages from the database before doing the conversion, and we forgot to issue a CASTOFF ALL command to prevent network system messages from interfering with the conversion utility.

We crashed a server twice when installing NetWare Global MHS. When the server didn't come back up, we had to call in a service request to Novell and perform VREPIR several times on an ailing hard disk.

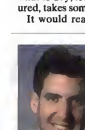
Finally, the museum has loads of traffic on the wire. The various network-based applications for handling admissions and gift shop sales generate lots of network traffic. This meant that we had to consider the traffic implications of placing GroupWise components.

Next week, I'll go into more detail on some of the other issues we faced in our installation.

Get a big cart: Guggenheim's GroupWise bill of materials

	Product	Includes	Quantity	Price
WordPerfect	Client/Administration pack for Windows	Windows LAN and remote client software and DOS administration tools	One five-user license	$695
	Client/Administration pack for DOS	DOS LAN and remote client software and DOS administration tools	One five-user license	$695
	Client/Administration pack for Macintosh	Mac LAN and remote client software and DOS administration tools	One five-user license	$695
	Volume license pack (100 – 499 licenses)		100 single-user licenses	$95 each
	Message Server Pack for NetWare		Two	$2,495 each
	Asynchronous gateway for DOS		Two	$495 each
	NetWare Global MHS gateway pack NLM			$1,495
Novell	NetWare Global Messaging Version 2.0		One 20-user license	$495
			Total	**$19,555**

David Strom is president of his own consulting firm in Port Washington, N.Y. He writes about his experiences installing and testing network products at reader sites. If you have a product or problem you'd like David to tackle, send him E-mail at david@strom.com on the Internet.



LAN Talk / Paul Merenbloom

Escape client/server dangers by preparing your network now

Well, it was inevitable. Client/server technology has forged its way into our LANs and is here to stay. Those of us who have fought with LAN- or PC-based TCP/IP or Systems Network Architecture implementations know the headaches that supporting multiple protocols can present. But I have some news: These have only been the warm-up rounds.

The popularization of GUIs and multimedia data streams such as video, voice, and graphics, in addition to traditional text, have launched a client/server explosion.

Worst of all, this development is often done without consulting the folks who have to keep it running — the LAN administrators and designers.

What does this mean for network administration? Plenty! If you're not careful, client/server development and implementation can increase network traffic, siphon your resources, and decrease desktop-level performance and user satisfaction.

OK. Does that mean client/server is bad for LANs? No. In fact, I view client/server maturity as a sign of approval that LANs have grown up and are able to support production jobs — what some glasshouse residents used to call "real computing."

But with this newfound approval comes a series of new challenges for network design and administration. Beware. If you don't adequately plan for them, client/server implementations can kill a network — byte by byte.

Here are some steps you can take now to avoid client/server disaster:

- **Isolate** the client/server application users from the rest of the network. Building physical or logical fire walls between the servers, their clients, and the remainder of the network will help keep unwanted traffic from flowing where it doesn't belong and could cause trouble.
- **Speed up** the delivery of data between servers. For instance, install a "server backbone" of 16MB Token Ring, 100MB FDDI, or at least port-switched Ethernet. Moving your servers onto one or more high-speed backbones can greatly decrease the latency in client/server applications. Besides, it will enable the servers to stay ahead of the communications demand curve, offering better performance for the client stations.
- **Tune your network**. Ensure that your drivers are up-to-date and that you're taking full advantage of your available resources. If you're in a Novell Inc. NetWare environment, make sure your packet size is 4KB, not 512 bytes. This can save a lot of workstation and network overhead. Also, eliminate any unnecessary communication protocols that can litter a LAN/WAN with packets, such as the old DXMA/DXMO drivers.
- **Establish baselines** using sniffer technology to learn what your network's normal (pre-client/server) behavior looks like. You may have network segments that are close to their saturation points. The introduction of a client/server application with 5-second updates (read: a lot more traffic) may be the final straw before performance for users on that network segment falls off the cliff. This data will help you to manage more effectively the LANs and WANs. More importantly, baselines will help you sniff out problem sections of the client/server applications (or workstations) should the need arise to address such sections (as it usually does).
- **Plan, plan, plan** by first understanding the resources employed by the client/server application. Who is going to receive data? How often? What types? Who will be broadcasting data? Again, how often and what types? Make a list of the various data types, packet size(s), transmission methods (ACK/NAK techniques), data transmission frequency, and impact of timeliness. These elements will enable you to visualize the likely data flow over the LANs/WANs and identify potential sensitive or impact points.
- **Test, test, test** and control the applications and release of systems. Users are in a hurry, but you'll be much better off loading the client/server components like electronic Legos, snapping them in one at a time and using monitoring tools to keep track of what they're doing. Turning on a turnkey system without testing may shut down your network.

It's important to remember that using client/server technology means — to borrow from Sun Microsystems Inc.'s Scott McNealy — "The network *is* the computer." Our job is to support that effort.

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PETER HOEY

Network management software

for NetWare LANs

BY PAUL FERRILL REVIEW BOARD
EDITED BY DAN SOMMER
SENIOR REVIEWS EDITOR

As corporations migrate legacy applications to client/server, the need to keep networks running at peak performance becomes even more apparent. Managing LANs requires a great deal of patience, as well as the ability to juggle multiple activities and user demands. Fortunately, today's LAN administrator doesn't have to go it alone. Increasingly sophisticated network management software packages can help with the multitasking.

In this product comparison, we look at four vendors' products that can handle many LAN administration tasks, including network monitoring, workstation management, client and server inventory, application metering, and reporting.

We evaluated Frye Computer Systems Inc.'s Frye Utilities for Networks (we tested five of the nine applications in the series); Intel Corp.'s LANDesk Manager, Version 1.51; Central Point Software Inc.'s LANlord, Version 2.1, and XTree Tools for Networks, Version 1.5; and Saber Software Corp.'s Saber LAN Workstation, Version 5.0, and Saber Server Manager, Version 1.0.

We considered Novell Inc.'s NetWare Management System (NMS) 2.0 for review, but to date it covers only the network monitoring and software distribution functions of our tests. There are many other network management products that handle only one or a few network management functions; we'll review those products separately in future issues. (See "Other products for network management," page 120, for a partial list.)

For this product comparison of network management tools, we updated our test plan with a task-oriented approach. (In previous comparisons — most recently July 12, 1993, page 58 — we based our scores on features.) We loosely structured our tests around the typical tasks that a NetWare administrator must perform and evaluated how well each product performed those functions. Some of these products also work with other network operating systems, but in this comparison we tested only with NetWare, the network operating system that makes up 60 percent to 70 percent of the market.

OUR READERS SPEAK. In looking at a typical day in the life of a network manager, we started with a survey of our readers who administer networks to see what issues most concerned them. In network monitoring, the most important issue was activity logs — capturing the history of traffic and alarms. For workstation management there were several key concerns, including the capability to edit client files, distribute software over the network, remotely control a client workstation, and provide a menuing capability.

Other functions our readers rated as important were the capability to monitor client system files, such as AUTOEXEC.BAT and CONFIG.SYS, and the need to send users clear messages when access to an application was denied due to requests exceeding the license (application metering).

We might have thought that experi-

enced LAN administrators wouldn't care as much about the case of installing a product; but according to our survey, it's one of their highest-ranked concerns — right behind free technical support from the vendor.

NOVELL'S PATH. In an effort to leverage its market leadership to other networking areas, Novell developed NetWare Distributed Management Services (NDMS) to enable administrators to centrally manage the network, desktops, software, and systems.

NMS is the key to Novell's NDMS strategy. NMS is a proposed family of products that manage a multivendor NetWare environment, including servers, hubs, analyzers, routers, Simple Network Management Protocol devices, and network addressing. Novell has plans to offer several impressive services, but few are shipping and some are not announced. The NMS 2.0 console and NetWare Navigator, for software distribution, are available now. (For more on NDMS and NMS, see "NDMS and NMS: Novell's spelling for network management," page 116, and "Untangling the network," July 18, page 51.)

Some of the vendors in this comparison have already implemented ways to "snap into" NMS with their products. Intel's LANDesk and Saber's LAN Workstation are available from the NMS console, and Frye's new Alert Interface Manager for NMS greatly extends the types of alarms that NMS now provides.

THE VENDORS. Each of these vendors takes a different approach to network management. Frye has its Swiss Army knife approach, in which you can buy up to nine utilities to cover various functions; they work well together and on their own. Intel has established strategic links with Novell to connect LANDesk and NMS; you can launch LANDesk from the NMS console, and LANDesk can monitor any device that appears on the NMS network map. LANlord and XTree Tools are still fighting to keep their identities after being acquired by a company (Symantec Corp.) that sells other network management products. Saber LAN Workstation's strengths are security and client management.

Frye's toolbox of cleverly named products is guaranteed to please not only acronym fanatics but also those who prefer buying piecemeal. The Frye product strategy is that customers should pick and choose, selecting the proper tools to address specific needs. All of Frye's current offerings are DOS-based programs, so you don't need a machine with lots of memory or a high-resolution screen. (Windows interfaces for portions of the Frye series are in the works; some should appear this year, according to Frye.)

With the exception of XTree Tools, all of the other products use Microsoft Corp.'s Windows as the platform for their management tools. LANlord also requires an OS/2 machine to monitor and record server activity and to act as a database server for the management console.

Intel's LANDesk is the only completely integrated product; it provides access to all functions from its icon-based desktop manager application. LANDesk focuses more on performance monitoring and troubleshooting than the other products and omits functions such as software distribution and application metering. (These are coming in the next release, according to Intel.) Using LANDesk's Probe software should allow a network manager to monitor activity on remote networks as easily as on the server one. (We did not monitor remote segments.)

LANlord and XTree Tools have both been acquired by Central Point Software in recent months. (Symantec has since bought Central Point.) Central Point got these products from different sources: It bought LANlord early this year from Microcom Inc. and purchased XTree Tools (and its maker XTree Co.) in November 1993. Together, these two products provide a well-balanced solution for network monitoring. Symantec's biggest problem ahead may be to convince current and prospective users that these products will remain viable when faced with Symantec's Norton Administrator for Networks. (We did not include this product here because it does not provide network monitoring. See Reviews, Nov. 8, 1993, page 96.) Central Point wouldn't comment on product plans, but there are rumors of a NetWare Loadable Module version of LANlord.

Saber LAN Workstation focuses on controlling the network by providing a menuing system for both DOS and Windows clients. It also has a very secure application-metering mode that allows programs to execute only if they are registered in the metering database. Saber Server Manager helps fine-tune network performance.

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These suites for NetWare LANs provide more than a handful of services, including network monitoring, client management, hardware and software inventory, and application metering

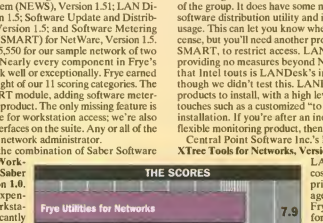
Executive summary

The primary goal of network management tools is to make the administrator's job easier. Tools should diagnose and fix problems with the least amount of user maintenance and should be simple to install and configure.

The four network management packages in our group have basic capabilities, but some provide extras that set them apart from the others.

Frye Computer Systems Inc.'s **Frye Utilities for Networks** came out on top. We tested five of the suite's nine products for this comparison: NetWare Management, Version 2.0; NetWare Early Warning System (NEWS), Version 1.51; LAN Directory (LAND), Version 1.5; Software Update and Distribution System (SUDS), Version 1.5; and Software Metering And Resource Tracking (SMART) for NetWare, Version 1.5. These products totaled $5,550 for our sample network of two servers and 100 clients. Nearly every component in Frye's toolbox performed its task well or exceptionally. Frye earned or shared top honors in eight of our 11 scoring categories. The still relatively new SMART module, adding software metering, is Frye's most recent product. The only missing feature is a remote control package for workstation access; we're also ready to see Windows interfaces on the suite. Any or all of the Frye products will help a network administrator.

The No. 2 scorer was the combination of Saber Software Corp.'s **Saber LAN Workstation, Version 5.0, and Saber Server Manager, Version 1.0.** This pair was the most expensive, at $6,440. LAN Workstation has improved significantly since our last review. A major addition is the SaberBasic scripting language, which we used to automate software distribution. This utility has some rough edges but is very powerful. LAN Workstation was tops in security — it can even lock applications you don't want run — and joint leader in workstation management. It also supports Novell Inc.'s NetWare Management System (NMS). LAN Workstation's drawbacks are in setup (it took the greatest effort of the four packages tested) and documentation. For administrators who put security first and powerful, flexible client management second, this is a strong product.



Intel Corp.'s **LANDesk Manager, Version 1.51,** is the only product we tested that is fully integrated; all the utilities come in one box and are launched from a single Windows interface. LANDesk was also the least expensive of the packages, at just $2,990 for our sample network. It tied for top score in network monitoring and installation, and it provided the best manuals of the group. It does have some major omissions: There is no software distribution utility and it only monitors application usage. This can let you know when you need to increase a license, but you'll need another product, such as Frye Utilities' SMART, to restrict access. LANDesk's security is limited, providing no measures beyond NetWare's. A key capability that Intel touts is LANDesk's interoperability with NMS, though we didn't test this. LANDesk was one of the easiest products to install, with a high level of automation and extra touches such as a customized "to do" list to follow after each installation. If you're after an inexpensive, easy-to-use, and flexible monitoring product, then look at LANDesk.

Central Point Software Inc.'s **LANlord, Version 2.1, and XTree Tools for Networks, Version 1.5,** finished close behind LANDesk. The combination cost $5,689, the second highest price among these four packages. XTree Tools tied with Frye Utilities and LANDesk for top score in our network monitoring category, and LANlord was a joint top scorer in workstation management and application metering. On the other hand, LANlord was the least capable of the four in inventory and reporting. We also ran into bugs in both metering and querying. You might view the need for an OS/2 server as a minus, though it did contribute to LANlord's inventory time, which was faster than any other product's.

A finger in every pie: poking around servers, clients on our NetWare LAN

In designing the tests for this comparison, we tried to emulate the typical fire-fighting tasks a network administrator has to handle. In our software distribution task, for example, we updated a new product for all users on the network. We looked carefully at the steps involved in performing the update and in generating a fairly complicated script that checked the amount of memory installed, available hard disk space, and so on.

Our test platform was a Novell Inc. NetWare 3.12 server connected to a mix of 486, 386, and 286 client machines. All were connected with thin-wire Ethernet.

INSTALLATION AND SETUP:

To evaluate this category, we looked at how difficult it was to install the package and how quickly we could tailor it to our system.

We rated satisfactory any installation that was bug free and not extraordinarily difficult. If the installation was somewhat automated and the average administrator could set up the application without difficulty, we rated it good. Installations earning higher scores were highly automated and posed all questions at the start, letting us know when we started loading disks that we wouldn't get knocked out of or have to cancel the install process before it finished.

Setup problems we looked for included the need to install software on more than one machine and any product-assumed configurations that we had to manually fix afterward.

PERFORMANCE:

Network monitoring: We ran a number of tests focused on finding, diagnosing, and fixing problems on the server. We filtered data with different criteria, exported data (for example, cache buffer, memory, and server utilization figures) to a spreadsheet, displayed server usage graphs, set alarm thresholds, and then generated an alarm. We looked for graphical displays of statistics and alarms (for when monitored values exceeded set thresholds, such as critically low disk space on the server). In each of these areas, we looked at how easy it was to accomplish each task, how many steps it took, and how useful the information presented would be to someone trying to fix a problem.

We rated satisfactory any application that displayed in a clear and organized fashion statistics collected by NetWare. To earn a score of good, the application needed to graphically display the statistics and alarms.

Packages rated very good set their own alarm thresholds, let us select the values tracked on-screen, provided a way to filter the recorded statistics, and monitored more than one server. They also had to let us enter custom alarm settings and select various ways to send alarm notifications. We awarded a score of excellent if the package tracked the impact of applications and workstations on network performance or if the package kept a history of network activity and provided a way to export that information to other applications, such as databases or spreadsheets.

Workstation management: We tested the capability of each package to view, edit, and replace system files — AUTOEXEC.BAT, CONFIG.SYS, NET.CFG, and so on — as well as their capability to detect changes to these files.

We also tested software distribution in this category. We attempted to create a script file with each product that included several different checks, including available disk space, memory amount, processor type, and other information, in order to upgrade to Microsoft Corp.'s Excel, Version 5.0.

Packages that provided network administrators some way of editing a user's local system files from another PC earned a satisfactory score. We gave extra points to products that let us send update files over the network, automatically selected different user upgrades based on the type of hardware and software in client PCs, or included remote-control software for troubleshooting and testing.

Inventory: We recorded how long it took to initially compile a record of software on the workstation, and then how long it took for subsequent scans. We also noted, when possible, the time it took to scan the servers. Our test workstation had 120MB in 5,200 compressed files on its hard drive; the server had 650MB in more than 15,000 files. We loaded a number of obscure executables, including shareware and freeware, to see how detailed the vendor databases were.

We looked at what flexibility the administrator had in scheduling inventory scans, how easy it was to view the collected information, and how accurate the information was. For example, we checked for the correct model number of the computer, the amount of available memory, and the DOS version number. We then noted what was necessary to manually update the software database.

We awarded a satisfactory score to software that recorded all file names on a workstation and put them in some form that could be searched and sorted. A package rated good had built-in dictionaries of common business applications and recorded the version number of applications it found. Higher scoring packages offered filters and control over when inventories took place.

We did not score the products based on the time required to complete the software scanning, though we did note the time it took on each workstation. For two of the products, Central Point Software Inc.'s LANlord, Version 2.1, and Intel Corp.'s LANDesk Manager, Version 1.51, we could not determine the total time to complete the updates; we did measure the time required to inventory the workstation, but the full time to update the database was "lost" in the combination of server and NetWare Loadable Module processes.

Application metering: We first examined how easy it was for an administrator to set up metering and observed how each product handled the configuration task. Next, we looked at metering from the user's perspective: We checked how a user was treated if all licenses were in use, including whether the user received a message or was put in a waiting queue. We noted whether a TSR was required

See HOW WE TESTED, page 112

REPORT CARD

INFO WORLD

Network management software suites for LANs

	(Weightings)	Frye Utilities for Networks		LANDesk Manager Version 1.51		LANlord Version 2.1 XTree Tools for Networks Version 1.5		Saber LAN Workstation Version 5.0 Saber Server Manager Version 1.0	
List price[1]		$5,550		$2,990		$5,689		$6,440	
Installation and setup	(100)	Very Good	(75.00)	Very Good	(75.00)	Good	(62.50)	Satisfactory	(50.00)
Performance									
Network monitoring	(125)	Excellent	(125.00)	Excellent	(125.00)	Excellent	(125.00)	Very Good	(93.75)
Workstation management	(125)	Very Good	(93.75)	Good	(78.13)	Very Good	(93.75)	Very Good	(93.75)
Inventory	(75)	Excellent	(75.00)	Good	(46.88)	Satisfactory	(37.50)	Very Good	(56.25)
Application metering	(75)	Very Good	(56.25)	Satisfactory	(37.50)	Very Good	(56.25)	Good	(46.88)
Queries and reports	(75)	Excellent	(75.00)	Good	(46.88)	Satisfactory	(37.50)	Good	(46.88)
Security	(75)	Good	(46.88)	Satisfactory	(37.50)	Good	(46.88)	Excellent	(75.00)
Documentation	(100)	Good	(62.50)	Very Good	(75.00)	Good	(62.50)	Satisfactory	(50.00)
Support									
Support policies	(75)	Very Good	(56.25)	Very Good	(56.25)	Good	(46.88)	Excellent	(75.00)
Technical support	(75)	Very Good	(56.25)	Very Good	(56.25)	Good	(46.88)	Very Good	(56.25)
Value	(100)	Very Good	(75.00)	Good	(62.50)	Good	(62.50)	Good	(62.50)
Final score		**7.9**		**6.9**		**6.7**		**7.0**	

[1]List price is cost for two servers and 100 clients.

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InfoWorld reviews only finished, production versions of products, never beta test versions. Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parentheses) of each criterion by its rating, where:

Excellent = 1.0 – Outstanding in all areas.
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Satisfactory = 0.5 – Meets essential criteria.
Poor = 0.25 – Falls short in essential areas.
Unacceptable or N/A = 0.0 – Fails to meet minimum standards or lacks this feature.

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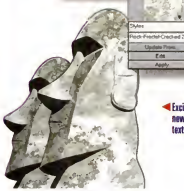

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HOW WE TESTED / from page 110

Poking around servers and clients

on the client machine and also noted the size of any TSR.

We rated a product satisfactory if it monitored the number of clients using a particular DOS or Windows application. We awarded a score of good if the product restricted access to an application. We awarded bonus points if a product restricted use of the application to specific employees or set times of day, or if it included data filtering, sorting, or reporting capabilities. We lowered scores if the package refused access to users but did not tell them why, or if the package didn't adroitly catch dropouts — users who didn't correctly close applications.

Queries and reports: We ran the canned reports provided by each application to see what information was provided and how easy it was to perform queries. We attempted to generate in each product the same custom report from scratch and to modify an existing report. We also attempted to export information from each product to a spreadsheet.

Products that maintained a simple historical database received satisfactory scores. Packages that maintained comprehensive databases of network information and could filter and export the data into comma-delimited ASCII files earned a good score. Packages earning a score of very good let us create custom queries and filters and customize report formats. We awarded bonus points to packages that let us add fields to databases (for example, to add maintenance or purchase history). This customization spares administrators from keeping a separate database (in Paradox, for example) to track network data that is not supported by the management package's database.

Security: We checked for any additional security measures provided by a product. If the package included screen savers or password screens on the administrator's console, we attempted to bypass them. We also looked for keyboard locks or security logs.

Packages that relied completely on NetWare's built-in security earned a satisfactory score. If a utility added extra levels of password protection, the product earned a score of good. We awarded additional points for added password protection for both the administrators and users, as well as for screen savers with passwords. We gave bonus points for options that automatically logged off users who had not accessed the network for a set time or for software locks that prevented users from exiting to DOS. We lowered scores if the utility had no security at the administrator's workstation.

DOCUMENTATION:

We evaluated the written documentation, on-line help, and other tools provided to assist the user in learning and using the product. To receive a score of satisfactory, the documentation had to be complete and clear enough to lead administrators through initial setup procedures and basic operations. We awarded bonus points for a quick-start guide, on-line and written tutorials, on-line (context-sensitive or hypertext-linked) help, a quick-reference card, and other useful material. Poor organization, missing information, or an incomplete index lowered the score.

SUPPORT:

Support policies: We awarded a satisfactory score for unlimited free telephone support from the vendor. We added bonus points for support via a fax-back service, on-line services (CompuServe, Internet, or a private BBS), a money-back guarantee, extended hours, or a toll-free line. We subtracted points for limited or no free support period.

Technical support: We based technical support scores on the quality of service we received during multiple anonymous calls to vendors and on the availability of knowledgeable technicians. We gave bonus points for efficient and accurate answers or service beyond the call of duty. We subtracted points for unreturned calls and long waits on hold.

VALUE:

We scored value based on how well a product worked, the number and types of management services it provided, and its price, relative to the competition. The prices we quoted were for a sample two-server, 100-client network.

Frye Utilities for Networks

Frye Computer Systems Inc. has taken its successful Swiss Army knife approach to network management tools to a higher level. It has enhanced several of the current products and offers a new module to plug the one large hole that remained: software metering. In spite of the proliferation of products, Frye does a good job of integrating the modules; each utility is available from another's menu.

The addition of Software Metering And Resource Tracking (SMART) for NetWare, now in Version 1.5, completes this package of products. Frye has also added the Alert Interface Manager (AIM), a Windows-based snap-in module that adds more alarm management capabilities to Novell Inc.'s NetWare Management Services (NMS). (We did not review AIM for this article, however.)

The complete list of products that we tested for this review are NetWare Management, Version 2.0; NetWare Early Warning System (NEWS), Version 1.51; LAN Directory (LAND), Version 1.5; Software Update and Distribution System (SUDS), Version 1.5; and SMART, Version 1.5. We did not test NetWare Console Commander, Version 1.0; Node Tracker, Version 1.0; or SUDS WAN Distribution Module, Version 1.0.

INSTALLATION AND SETUP

Frye Utilities was very easy to set up. The only drawback was having to separately load each module. We were able to install and run the entire suite of tools with no help from technical support and little need for the manuals.

Frye Utilities does not fully automate modifying system files; it works with the administrator. When changing files such as NetWare's AUTOEXEC.NCF, we worked through the normal NetWare SYSCON editor but enjoyed several Frye-added functions, such as the ability to choose where we could paste the required commands. This spared us from having to return to these files after installation in order to edit them to our taste.

Score: Very Good (75.00).

PERFORMANCE: NETWORK MONITORING

NetWare Management coupled with NEWS provided comprehensive network monitoring tools. In performing our tasks, we found NetWare Management to be especially adept at presenting easily readable information in both tabular and graphical formats. We set parameters (such as looking at dirty cache buffers) in several NetWare Management reports and printed out the screen.

The number of parameters that NetWare Management can track and that NEWS can use to generate alerts is astounding. For example, for server memory alone, NetWare Management provided 10 statistics on actual size and percentage of RAM usage. NEWS allowed us to set thresholds for any of these parameters.

Even though the Frye Utilities tools are all DOS based, they still provided terrifically useful information to our network administrator. (Windows interfaces in new or existing products are due starting later this year, according to Frye.)

We enjoyed using NetWare Management's SYSCON

See FRYE UTILITIES, page 114

LANDesk Manager 1.51

Since we first covered Intel Corp.'s LANDesk Manager (Version 1.01) in our July 12, 1993, product comparison, it has gained a few new features and improved functionality in others. LANDesk, Version 1.51, is strongest at network monitoring, and it's the only product in this comparison that puts all the vendor's tools in a single Windows product.

The main new item is "snap-in" compatibility with Novell Inc.'s Network Management System (NMS). If you're using NMS, you can launch LANDesk and use its tools with any device on the NMS map. There's also support for NetWare 4.0 in bindery emulation mode, and the remote-control feature has been enhanced with asynchronous dial-in capability. New functionality in the inventory area includes full server hardware and software scanning and support for Macintoshes. One big bonus is the replacement of the 88KB TSR that enabled the application monitor on workstations. This function is now lost to DOS clients, but for Windows clients the TSR has been replaced by a DLL.

LANDesk includes built-in virus protection (though we did not test this), and Intel offers a separate anti-virus NetWare Loadable Module (NLM), Virus Protect, which works with LANDesk or NMS.

INSTALLATION AND SETUP

LANDesk had one of the smoothest installation programs of the group. LANDesk made its changes to login scripts and system files without any intervention from us, although we were able to approve all changes. LANDesk correctly assumed that our AUTOEXEC.BAT logged us in to the network and thus added a line to the end of the file to run BREQUEST, the workstation Btrieve requester. This is a 29KB TSR that enables the inventory manager.

We liked the TODO.TXT file that was created for each installation; this detailed any additional steps, such as manually loading certain NLMs or restarting the server, that we needed to take to get the program fully operational. We were able to get the program running without any calls to technical support.

Score: Very Good (75.00).

PERFORMANCE: NETWORK MONITORING

LANDesk offers a comprehensive network monitoring suite. We had a choice of setting up either a management station with Open Data-Link Interface (ODI) drivers that supported promiscuous-mode transfers, or a dedicated workstation running LANDesk's Probe software. We chose and easily set up the Probe station, which let us monitor other segments — such as on the far side of a router or bridge. The management station method is similar, though it's restricted to the local segment.

The Probe workstation gathered information and updated the console program whenever we chose the traffic monitor or application monitor tools. LANDesk's console program provided an intuitive, icon-oriented point-and-shoot interface for viewing graphs or tables of network activity, determining the load on the network caused by a single workstation or application, and reviewing current and historical network performance.

The default filters isolated specific hardware errors and individual packet types for us to view. Beyond those,

See LANDESK, page 114

LANlord 2.1 and XTree Tools for Networks 1.5

Central Point Software Inc., now a subsidiary of Symantec Corp., has two strong network management products that complement each other. LANlord, Version 2.1, focuses on workstation management of real-time data, while XTree Tools for Networks, Version 1.5, handles network monitoring. We reviewed them as a package, the same way we treated Frye Utilities for Networks from Frye Computer Systems Inc.

LANlord's improvements over the previous version include a smaller client TSR for workstation management, support for Novell Inc. NetWare 4.x's Virtual Loadable Modules, and new messaging support. XTree Tools has gained a remote control utility (Reach Out) and a multiwindow text editor that replaces NetWare's SYSCON.

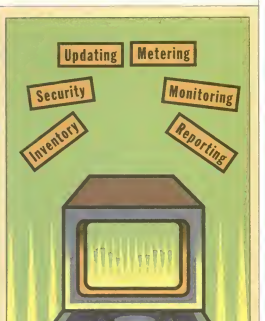
There are some differences between these products: LANlord is a Windows product that runs on an administrator's workstation and connects to its own OS/2 server; XTree Tools is DOS based. Central Point has pledged to give them a common interface, but that hasn't yet happened. LANlord, like Intel Corp.'s LANDesk Manager, offers virus protection, though we did not test this. We reviewed LANlord, Version 2.0, in the Sept. 13, 1993, issue (see "LANlord 2.0 is robust workstation manager," page 93). XTree Tools for Networks, Version 1.0, was last reviewed in our July 12, 1993, comparison (see "Taking control," page 58).

Saber LAN Workstation 5.0 and Saber Server Manager 1.0

In our last network management software comparison, we reviewed Saber LAN Workstation, Version 1.0. Since then, Saber Software Corp. has jumped to Version 5.0, though that doesn't mean the software has been through four more versions. The leap was to make clear that all their separate products have come together in their latest forms in a single release.

New features since we last looked at the product include improved software distribution, the SaberBasic scripting language, enhanced security controls, and better alarm notification. LAN Workstation suffers most in setup and documentation, though both have improved since our last review. LAN Workstation's console is a Windows application, but it provides menuing and metering for DOS and Windows clients. It also supports Novell Inc.'s NetWare Management System (NMS) and can be launched from the latter's toolbar.

The new Saber Server Manager, Version 1.0, helps network administrators fine-tune network performance by monitoring statistics and changing the SET parameters of NetWare. Both LAN Workstation and Server Manager have Windows interfaces, though there's no sharing between them, with the exception that you can call the Server Manager from LAN Workstation.



Summary

INSTALLATION AND SETUP

The greatest trouble we had with the installation of LANlord was the need to set up an OS/2 machine for the LANlord server. There were some conflicting RAM requirements in the manuals, but once we loaded the program on an 8MB machine everything worked fine.

The install program did not make modifications to the NetWare log-in script automatically, so we had to edit them by hand. This was simple enough but time-consuming.

Two programs gather inventory information and check for viruses each time a user logs in; a third program, a TSR, must be installed for real-time monitoring and control.

XTree Tools, on the other hand, was one of the easiest products to install. It required minimal intervention — and no help from technical support — to get running. **Score: Good** (62.50).

The installation for LAN Workstation was the most tedious of the group. The level of automation was well below that of Intel Corp.'s LANDesk or Frye Computer Systems Inc.'s Frye Utilities. We had to manually edit the NetWare log-in scripts and Windows .INI files, and perform a number of secondary steps — such as copying files, loading NetWare Loadable Modules (NLMs), and scanning the disk for applications — to fully install the system. Although the documentation says that you can run the workstation hardware inventory program from the log-in script, we were not able to get this to work without a support call. We had no trouble installing Server Manager. **Score: Satisfactory** (50.00).

INSTALLATION AND SETUP

Intel Corp.'s LANDesk Manager and Frye Computer Systems Inc.'s Frye Utilities for Networks were the easiest products to install. One thing in LANDesk's favor was that it is an integrated product; we had to load five Frye modules, though they caused us no trouble.

Central Point Software Inc.'s XTree Tools for Networks was also straightforward, but LANlord required us to load the software on multiple machines, including an OS/2 server. Installing Saber Software Corp.'s Saber Server Manager was easy, but with Saber LAN Workstation we needed to edit configuration files by hand, and we had to call technical support to get the product running.

PERFORMANCE: NETWORK MONITORING

XTree Tools matches Frye's NetWare Management, Version 2.0, in LAN monitoring, including its replacement functions for all the standard NetWare tools — even the editor. XTree Tools has the same familiar interface that Frye Utilities and NetWare use for all their DOS tools.

Performing our tasks was a snap and only required pressing a few keys. We used the configuration manager to view static information about the server (such as NetWare SET parameters) and to view and modify files such as AUTOEXEC.NCF, the system log-in script, and others. The server monitor provided real-time monitoring of server parameters. The server manager showed — on a single screen — a graphic of overall server utilization, general information about the server, and volume information about mounted disks.

The NetTrack program, an option on the main XTree Tools menu, offered a well-organized, real-time tabular display of server, file I/O, and LAN I/O statistics on a

See LANLORD AND XTREE TOOLS, page 115

Several useful features have been added to the network monitoring capabilities of LAN Workstation. The improved disk monitor has a built-in alarm notification feature that can send messages via E-mail, pager, or 25th-line message.

Alarm threshold levels must be established for each disk volume and for all file owners. (When we enabled disk monitoring, it presented us with default values of zero. A better approach would have been to suggest default values to help a system administrator.) If you use the disk monitor, as we first did, thresholds are expressed as a percentage of the disk and correspond to a specific alarm level. Using the event agent, on the other hand, you have more flexibility; for example, you could assign a different level of alarm for a disk that was 60 percent full than for one that was 90 percent full.

A report feature allowed us to view disk usage by owner, directories, or volume in either tabular or graphical form. We also found convenient access to the standard

See SABER, page 115

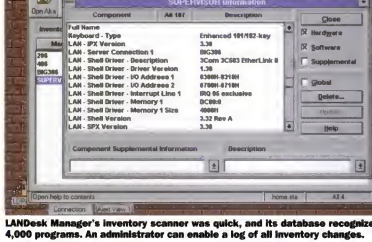
NETWORK MONITORING

Two similar outstanding products for network monitoring are Frye's NetWare Management and NetWare Early Warning System (NEWS) duo, and XTree Tools. Both of these offered extensive information about the server and presented the data in both tabular and graphical formats. Both products have alarm capabilities with many notification options. With Frye, for example, we chose the 25th-line notification method, but we could have easily selected any of nine other methods. LANDesk, which matched those two in score, provided similar data but with more of a performance slant, offering both current and historical data for review.

Saber Server Manager took a different approach than the other products. It focused on tuning a NetWare server for optimum performance. The data that Server Manager gathered and displayed helped the network administrator decide how best to configure the system.

See SUMMARY, page 115

Frye Utilities' NEWS allows an administrator to set thresholds and choose alerts for the numerous server parameters that the Network Management utility gathers.



LANDesk Manager's inventory scanner was quick, and its database recognizes 4,000 programs. An administrator can enable a log of all inventory changes.

SNMP: popular protocol for network management

BY BRETT GLASS REVIEW BOARD

In the 1980s, the only network management protocol that had achieved substantial success was IBM's NetView, a proprietary set of utilities and protocols developed for IBM's Systems Network Architecture (SNA). But since both SNA and NetView were proprietary, a different standard needed to emerge for other types of networks.

A flurry of development activity followed, resulting in two standards. The Simple Network Management Protocol (SNMP) was developed by the Internet Engineering Task Force primarily for TCP/IP networks (though there are no barriers to implementing it on top of other protocol suites), and the Common Management Information Protocol (CMIP) became part of the Open Systems Interconnect (OSI) protocol suite.

SNMP has enjoyed great success and is widely implemented (Novell Inc.'s NetWare Management System uses SNMP running on its protocol IPX), but CMIP has not fared as well, primarily due to its greater complexity and the overall lack of acceptance of the OSI protocol suite.

SNMP lets a network administrator control hubs, routers, and other network equipment via a Management Information Base (MIB). A MIB is a tree-structured database of status and configuration information that can be read or changed (thus changing the network configuration) from across the network. In theory, a MIB can be created to manage any type of equipment. (John Romkey, founder of FTP Software Inc. and longtime Internet hacker, demonstrated this by creating a MIB for an electric toaster and using SNMP to make breakfast via the Internet.)

Although SNMP's flexibility makes it very powerful and capable, this flexibility is also a liability, because a network management utility needs to have some idea of how a device's MIB is structured in order to manage it correctly. RMON MIB — the standard Remote Monitoring MIB designed to control network and diagnosis functions — solves this problem and is routinely implemented on hubs, routers, and other network equipment.

If your need is to manage just a few Novell NetWare servers for a department or campus, then you probably won't need SNMP. However, if you need to control routers and other hardware that handle the low end of the protocol stack, or if you have heterogeneous or remote hardware to manage, then you should consider implementing SNMP on your network. For client management in these situations, you may eventually be able to turn to Desktop Management Interface. (See "DMI: Micromanagement of the desktop workstation," page 116.)

Frye Utilities (Continued)

PERFORMANCE: NETWORK MONITORING

replacement for system maintenance. We found that the user clone feature made adding new users a snap. (There are also improved versions of PCONSOLE and FILER.)

NEWS provides real-time monitoring and alerting of critical network parameters at the server level. Working in concert with SUDS and LAND, NEWS detected and reported hardware and software changes at the workstation level. NEWS also works in conjunction with SMART to generate alerts if some metering threshold is exceeded.

We used NEWS to check for a specific file on the server. The whole process took less than 5 minutes and was easy to accomplish. **Score: Excellent** (125.00).

PERFORMANCE: WORKSTATION MANAGEMENT

Using LAND and SUDS gave us a formidable package for workstation management. LAND had more information packed into it than any other product we tested; it even included the serial number of our IDE hard disk. LAND let us see virtually anything we wanted on our workstations; in one case, it found our NET.CFG file even though it wasn't in the root directory or on the DOS path.

We found it extremely easy to create a software distribution package and send it out to the workstations. SUDS included a number of sample scripts that performed various functions, from updating a single file to installing a software upgrade. The scripting language provides the capability to modify system files, which let us update paths in AUTOEXEC.BAT and increase the FILES= statement in CONFIG.SYS, for example. The only thing preventing an excellent rating is the lack of a remote-control component. **Score: Very Good** (93.75).

See FRYE UTILITIES, page 116

LANDesk (Continued)

PERFORMANCE: NETWORK MONITORING

we easily defined thresholds and set alarms to generate alerts, which could notify us via pager or beeper, ccMail, 25th-line message, or an audible alarm at the console. We also set alerts to trigger specific responses, including executing a program and writing to a file. (With this method, we could have written programs to purge files or start a backup.)

Other tools included Application Monitor, for tracking applications run from the server, and Queue Monitor, for tracking print queues. We liked using the Application Monitor to see the effect on network traffic of loading Excel from the server.

Score: Excellent (125.00).

PERFORMANCE: WORKSTATION MANAGEMENT

LANDesk analyzes rather than manages workstations. The desktop access utility let us easily view information about individual workstations, remotely control a workstation, transfer files, execute a program, and restart. LANDesk required one of two TSRs on each workstation to enable chat mode and file transfer: LANSEL.COM is for DOS clients; USER.COM is for Windows clients. Each program used approximately 5KB to 6KB of memory.

LANDesk has no software distribution utility. (It will be included in the next version, according to Intel.) We had to use the remote-control program to modify AUTOEXEC.BAT and other system files; we also could have transferred a file to the management workstation, edited it, and sent it back. In either case, however, these methods did not replace a real distribution program.

Score: Good (78.13).

See LANDESK, page 116

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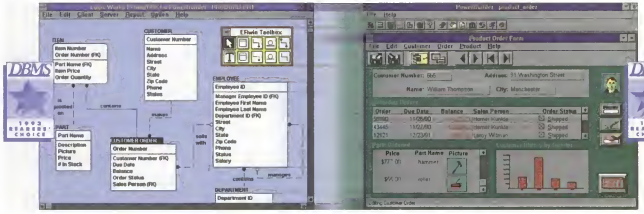

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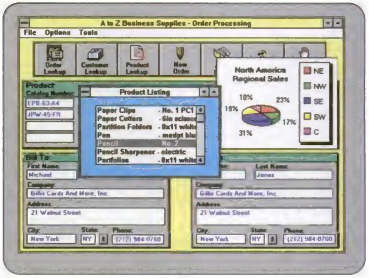

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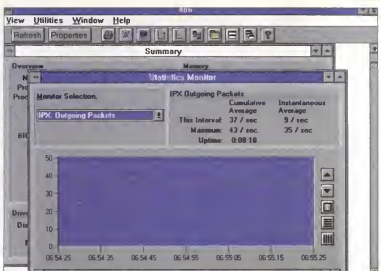
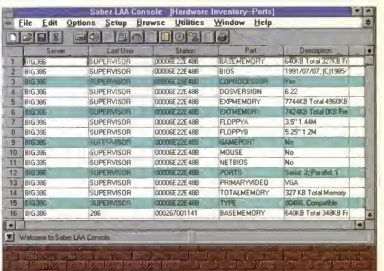


LANlord is very strong at monitoring workstations. It offers several graphical monitors that gather real-time network data from the client's perspective.



Saber LAN Workstation's hardware inventory utility keeps extensive data and can download start-up files, such as AUTOEXEC.BAT, if it detects changes.

LANlord and XTree Tools
(Continued)

PERFORMANCE: NETWORK MONITORING

single page. We used it to establish baseline operations and thresholds.

WatchLAN is XTree Tools' equivalent of Frye's NetWare Early Warning System (NEWS), Version 1.51. We were able to set up with little effort a threshold for disk usage and then generate an alarm that showed up on the supervisor's workstation. XTree Tools has most of the same notification options as NEWS, though it lacks fax and voice capabilities. **Score: Excellent** (125.00).

PERFORMANCE: WORKSTATION MANAGEMENT

LANlord's forte is managing client machines. In addition to what Frye's LAN Directory (LAND), Version 1.5, provides, LANlord has several real-time graphical monitors that watch IPX, SPX, and shell statistics. XTree Tools has a similar feature, the workstation monitor, that requires an 8KB TSR on the workstation. LANlord — with a 6.5KB TSR — is a better choice than XTree Tools for this function.

We used the current and past activity screen to observe the currently executing program and view a history of the programs that had run on a workstation. We easily applied filters to the list to see when a client had executed a specific program. The Windows Information option showed us the current task and module list in Windows, Graphics Device Interface and user heap statistics, and resource information.

LANlord, like LANDesk, has no software distribution utility. LANlord does, however, include Microcom Inc.'s Carbon Copy for Windows, a full-function remote-control program. **Score: Very Good** (93.75).

See LANLORD AND XTREE TOOLS, page 117

Saber
(Continued)

PERFORMANCE: NETWORK MONITORING

NetWare utilities from a pull-down menu.

We used Server Manager to display graphs of server usage and disk usage and to keep historical data on network performance. We found the graphical displays easy to produce; they provided a useful picture of what was happening on the server. This product is designed for performance tuning, so it provides no alarms. **Score: Very Good** (93.75).

PERFORMANCE: WORKSTATION MANAGEMENT

Saber has added software distribution features and Ocean Isle Software's Reach Out remote control product. SaberBasic provides a full-featured Basic language for creating programs to automate the software distribution process. (It's useful for other functions: Because it's mail enabled, you could use it to automate the distribution of reports via E-mail, for example.) Built-in language features include functions to check for hardware type, memory, or disk space available and the presence of other files on the target machine.

After clearing a minor syntax hurdle (in specifying parameters for a particular function), we created a script that checked for a 386 or better processor and at least 20MB of free disk space. The SaberBasic manual does not contain a list of all the available functions, although we were able to find them on-line.

We did have a few small problems; for example, we found that a compiled .EXE file had to have its DLLs in the path; we had to add this by hand, and there was no suggestion in the manual that it was necessary. The compiler provides a nice error-correction feature that places you back in the editor at the point where the error occurred. SaberBasic was a powerful utility, although it took us some effort to work with it. Frye's Software Update and Distribution System (SUDS) was an easier product to use. **Score: Very Good** (93.75).

See SABER, page 117

Summary
(Continued)

NETWORK MONITORING

(See page 113.)

WORKSTATION MANAGEMENT

All four products were relatively close in this category; Frye and Saber were the only two vendors that offered a software distribution capability for updating or installing new programs.

LANlord provided the most extensive real-time information about the operation of each workstation, even including the amount of free Windows resources available. We liked the fact that LANlord's real-time approach extended to the hardware and software level of each workstation, showing both static information, such as DOS environment and path, and dynamic information, such as packet traffic to the workstation.

LANDesk also offered real-time statistics but focused on the network operation rather than on the workstation. All of the products — with the exception of Frye Utilities — offer some type of remote-control capability.

See SUMMARY, page 117

NDMS and NMS: Novell's spelling for network management

BY PAUL FERRILL REVIEW BOARD

With the introduction last year of NetWare Distributed Management Services (NDMS), Novell Inc. leaped into the realm of distributed network management. NDMS is supposed to offer administrators an open system platform that can be expanded and supplemented by both Novell and third parties. At the core is the Simple Network Management Protocol (SNMP).

Novell's key to NDMS is its NetWare Management System (NMS). Version 2.0 of NMS was announced in October 1993 in conjunction with NDMS and several add-on tools, including NetWare LANalyzer Agent 1.0, a network mapping and analysis tool, and NetWare Navigator 3.0, a software distribution tool. Since that time, Novell has released LANalyzer for Windows 2.1 with support for NetWare, Unix, Macintosh, and IBM LAN Server networks.

Using SNMP allows NMS to interoperate with other management consoles, such as Hewlett-Packard Co.'s OpenView, IBM's NetView, and Sun Microsystems Inc.'s SunNet Manager. Using SNMP also allows NDMS to leverage a proven network standard.

NMS uses a building-block approach that allows third-party developers to "snap in" their tools, such as Intel Corp.'s LANDesk Manager and Frye Computer Systems Inc.'s Alert Interface Manager, to the NMS console.

The two main pieces of NMS are the console and the server. All user interaction is controlled by the NMS console, which is a Windows-based application. The NMS server uses various NetWare Loadable Modules to gather statistical information about the network and to communicate with the NMS agents. Current NMS agents include the NetWare Management agent for gathering dynamic data about NetWare servers, the NetWare LANalyzer agent for monitoring and analyzing network segments, and the NetWare Hub Services agent for gathering data on Hub Management Interface hubs, cards, and ports.

Another player in the NMS game is Novell's AppWare, a multiplatform application development tool. Using AppWare, Novell hopes to port new management applications across all the major platforms, including OS/2, Unix, and Windows. AppWare has just shipped after much fanfare, but for now, it's slow to win acceptance (see "As AppWare ship date nears, support wanes," Aug. 22, page 1). There's also some uncertainty at Novell about AppWare's future. (See "AppWare strategy in disarray," Sept. 5, page 5.)

It remains to be seen how successful Novell's efforts will be to promote NDMS, NMS, and AppWare. NMS is still more a promise than reality, and other vendors have only just begun to provide support in their products.

DMI: Micromanagement of the desktop workstation

BY BRETT GLASS REVIEW BOARD

If SNMP is the Simple Network Management Protocol, think of DMI, the Desktop Management Interface, as the ultimate micromanagement protocol. While SNMP is theoretically capable of managing any hardware device that can be connected to a network, its use in the real world is normally limited to network equipment. Thus, the Desktop Management Task Force (DMTF), whose members include Digital Equipment Corp., Hewlett-Packard Co., IBM, Intel Corp., Mi-

See DMI, page 120

Frye Utilities (Continued)

PERFORMANCE: INVENTORY

LAND is the main inventory program. It gathered and tabulated numerous parameters for both workstations and servers, and it offered many interval choices for scanning.

On our servers, LAND included information about all disk subsystems, including the I/O port and interrupt request settings of the controller card. We collected reams of information on our workstations, including versions of system software and obscure hardware details.

LAND's database of known software packages — more than 6,000 products — was completely editable. When LAND wasn't sure about the identity of a file, it put a question mark beside it as a flag for the administrator. The software detection feature used file names as its primary source; if that failed, it could also check for a second file. LAND automatically recorded copies of AUTOEXEC.BAT, CONFIG.SYS, and any other file that we specified, up to 16KB in size. We also used LAND in combination with SUDS to copy files to the server and then send them back to the workstation.

LAND runs its inventory program and file collector from the system log-in script, which spared us from making start-up changes in more than one place. It took an average of 1 minute, 28 seconds to scan and inventory the software on our compressed-drive workstation; the second pass took an average of 38 seconds. The server scan took an average of 6 minutes, 50 seconds. LAND recognized the greatest number of our program files, 122 of 733. **Score: Excellent** (75.00).

PERFORMANCE: APPLICATION METERING

SMART, Version 1.5, adds the capability to meter workstation-based .COM and .EXE files. There are two agents for metering client-installed applications: WINSMART for Windows applications and the 5KB TSR DOSSMART for DOS. SMART can also meter Macintosh applications that run on a NetWare server.

We found monitoring application usage simple, and the SMART menu provided a graphical display of application usage. The main menu let us view individual packages by current users, waiting users, and notified users. SMART also let us grant temporary trustee rights to directories as an application required access. We easily established thresholds for the number of users waiting for an application and instructed NEWS to send an alert when the number got too high. The only thing SMART can't meter is groups, as LANlord can.
Score: Very Good (56.25).

PERFORMANCE: QUERIES AND REPORTS

Reporting has always been one of Frye Utilities' best areas, and it's still the case. Frye Utilities is the only suite we tested that offers a full-blown report generator; we started with the standard reports and easily modified them by adding and deleting fields, rearranging columns, adding titles, and more. If you can think of a way to query the database, Frye Utilities can support it. One uncommon but useful report we found was a summary of all workstation software by version number. With this report we could quickly and easily see just what was installed on a particular workstation, or pare it down to a specific program on all workstations.
Score: Excellent (75.00).

See FRYE UTILITIES, page 120

LANDesk (Continued)

We set up hardware and software scans in the system log-in script; we could easily specify any interval or use the default daily, weekly, or monthly settings. Server scanning, using an NLM, is new since our last review, as is the capability to scan Macintoshes. We found that neither the server nor the workstation scanners logged software that are not in the database of more than 1,300 products. (Intel now offers on-line a version of the database that has about 4,000 entries.) We were easily able to add other packages by choosing Edit Software List from the inventory manager's main menu.

The inventory scan function was one of the fastest we tested. Like Central Point's LANlord, LANDesk worked relatively quickly, though we couldn't determine when the database update had actually finished. (We could see when the client was done reporting, but the database updates were "lost" in the NLM and server functions.) LANDesk averaged 53 seconds on the initial workstation software scan and 21 seconds for the subsequent scan. We couldn't track the server inventory time. LANDesk recognized only 31 of our 733 program files.

We set the inventory manager to create a log for detecting changes in inventory items. The inventory manager typically updated the log when it detected a change, though there is a way to send an alert. You can write an alert that instructs the inventory manager to send a 25th-line message to a user or administrator.
Score: Good (46.88).

PERFORMANCE: APPLICATION METERING

LANDesk monitors application use on servers and workstations, but it cannot meter or restrict access. (Metering is coming in the next version, according to Intel.) We employed the Application Monitor to track network traffic; it allowed us to see what kinds of files were being transferred across the network and what impact they had on overall performance. Various options allowed us to display information on either an application or workstation basis. Another option saved data to a file for creating customized reports. We found the reporting method easy to follow, but it did require exporting to a spreadsheet to create a custom report.

The Probe workstation can monitor applications running on workstations on other LAN segments, or you can use a management station with the promiscuous-mode ODI driver on the local segment.
Score: Satisfactory (37.50).

PERFORMANCE: QUERIES AND REPORTS

LANDesk provides a number of useful predefined reports for each application. We tested without difficulties a number of the program's elaborate ways to query the database, using logical operators and the different fields. For example, we were able to easily create one query to select all workstations with a 486 processor and at least 4MB of memory.

The query building box helped us build a query and caught any syntax errors. These reports could be exported to either ASCII or comma separated variable files. We could not define custom reports nor add databases, though there is a method for adding fields via the "supplemental information" function. LANDesk supports DDE for exporting data into Excel, for example, or any other DDE-aware application.
Score: Good (46.88).

See LANDESK, page 120

LANlord and XTree Tools (Continued)

PERFORMANCE: INVENTORY

Although LANlord added the name of every file on our workstation to its inventory database, it "recognized" none of them. (All the other products were capable of matching at least some of the file names with short identifying descriptions.) After scanning, we found in the database EXCEL.EXE, for example, but we couldn't tell that we had Microsoft Corp.'s Excel, Version 5.0, as we could with the other products we tested.

Because LANlord didn't compare the list it created to an existing database, the software inventory-gathering process was fast, taking an average of 49 seconds for the initial scan and 12 seconds for the subsequent scan. These times were the quickest among the products tested. We couldn't measure the transfer of the inventory records to the LANlord server's database because this happened in the background; this also prevented our timing the server inventory. LANlord uses Novell's Btrieve on the OS/2 machine for all its database functions and suffers from poor performance because of it (that's an OS/2 limitation). Database insertions happen at the rate of just two per second, according to the vendor; a 5,000-file update would take more than 41 minutes.

The hardware inventory is thorough. We noticed that you can get different reports on the size of a compressed hard disk drive. The Volume section reported the logical size of the drive, which was 180MB. The Drive section reported the physical size of the disk — 120MB. LANlord inventories only DOS and Windows clients.

Score: Satisfactory (37.50).

PERFORMANCE: APPLICATION METERING

LANlord's software metering function works for DOS and Windows clients. It allows you to limit the number of concurrent copies of a particular application or to simply track its usage. All metering is done on a group basis; thus we could assign a certain number of copies to one group and a different number to another group. LANlord also gave us the flexibility of assigning licenses by individual group or by the group "All," to which everybody belongs.

Users attempting to run an application beyond its license receive a message that it's unavailable and to contact the network administrator. LANlord does not offer queuing to waiting users.

One hitch we discovered was that LANlord was incapable of accurately metering a file with a license count of one. Central Point provided us with a patch that fixed the problem and said this would be fixed in the next release. **Score: Very Good** (56.25).

PERFORMANCE: QUERIES AND REPORTS

LANlord's reporting feature provided seven canned reports that focused mainly on workstation information. We were able to filter these but not modify them. The inventory manager, however, provides an extensive querying capability for selecting records from the database for viewing on-screen, although when we selected an obscure directory ID parameter, it caused a Windows General Protection Fault. (Central Point acknowledged the bug and promised that it would be fixed in the next release.)

All of the XTree Tools utilities have a built-in report function that includes the capability to view reports on-screen. **Score: Satisfactory** (37.50).

See LANLORD AND XTREE TOOLS, page 121

Saber (Continued)

Saber LAN Workstation's inventory database contains 1,190 entries; we could manually, though easily, update it from the Saber console program. Like Frye's LAN Directory (LAND), Saber could check a second file to identify a program. Saber uses its software inventory to feed the application monitor. However, if the inventory did not find a program in its database, we could not run that program after we enabled application metering in secure mode (which was the default).

One hitch is that the program does not log files that are not in the database. We wrote a SaberBasic script to search for all executable files on a drive, but then we had to compare that list to the records in the database. The initial scan of software on our workstation hard disk took an average of 1 minute, 32 seconds; subsequent scans required 54 seconds. The server scan ran in 10 minutes, 24 seconds. Saber recognized 67 of our 733 program files; that was the second highest total, after Frye's LAND.

The hardware inventory program can be disabled or scheduled for certain times or days. Saber provides a useful replacement program for NetWare's LOGIN.EXE. (The Saber inventory program wouldn't work for us when inside the NetWare log-in script, due to NetWare's habit of gobbling up big chunks of memory.) One nice feature of the hardware scanner is its capability to download system or text files, such as AUTOEXEC.BAT, CONFIG.SYS, and others, if a change in those files is detected. **Score: Very Good** (56.25).

PERFORMANCE: APPLICATION METERING

Saber provides two methods for application metering: WMONITOR monitors programs launched from Windows (whether they're DOS or Windows applications), and SMETER monitors DOS-launched programs.

Setting up application metering proved a challenge until we discovered that we couldn't meter anything unless it was registered in the software inventory database. Once past this stumbling block, we had no trouble with this function. The secure mode does give Saber a feature that the other programs don't have — total control over which programs can be executed, including those on the user's hard disk.

Saber sent clear messages to users when an application had no free licenses. It did not queue users.

Score: Good (46.88).

PERFORMANCE: QUERIES AND REPORTS

Saber provided a number of canned reports for each feature of the program. It took us a while to find the report function (we had to select File New or the New button on the tool bar); once we found it, things went smoothly. The menu bar changed once we selected a report or browse option, and it allowed us to select filters, export data, arrange, sort, or find data, and change the fields to display. We could not modify any of the reports to add new fields, although we could hide existing fields from being displayed. It's also possible to do a custom browse and print those results. LAN Workstation supports DDE. **Score: Good** (46.88).

See SABER, page 121

Summary (Continued)

INVENTORY

Frye Utilities was the clear winner in workstation inventory. Its LAN Directory (LAND) database of more than 6,000 software packages gave it a big advantage over the competition. Saber LAN Workstation's database was second to LAND's in size. It had a number of useful functions, such as the tie-in to the application meter's secure mode, but it took us a few tries to understand and work with them. If an executable was not identified, both products could check for a second file, such as a DLL, that might confirm it.

LANDesk was the second fastest product in our timing test, though it recognized relatively few applications on our workstation. (Intel now offers a database of 4,000 entries.) LANlord was the fastest product to inventory the client, though it was quite slow to finish the data writes on the server; Novell's Btrieve, which LANlord uses on the OS/2 machine, was poky.

APPLICATION METERING

Frye's Software Metering And Resource Tracking (SMART) and LANlord shared the honors in metering applications. SMART provided both server- and workstation-based metering. LANlord had similar capabilities, and it could also meter applications by groups of users. This feature is handy if different departments within your company pay for their software out of separate budgets. LANlord registered individual software licenses either by application name or by a specific path and filename; thus LANlord monitored EXCEL.EXE whether it was executed from a network or a local drive.

LAN Workstation's metering worked well but was somewhat tedious to set up. Saber did offer a secure mode, in which no application could be run unless it was registered in the application database. LANDesk could not restrict user access; it offered only software monitoring. It did, however, allow us to monitor a single server-based application to determine its effects on the network.

QUERIES AND REPORTS

Frye Utilities wins this category hands down. It was the only product we tested that included a custom report writer, which also had strong export capabilities. We were able to easily edit and customize the canned reports.

Though LANDesk and LAN Workstation offered a well-balanced set of predefined reports, they didn't let us modify those reports in any way. We found a bug in LANlord, which consistently crashed when we tested an uncommon query.

See SUMMARY, page 121

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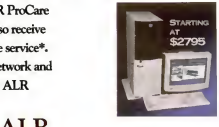

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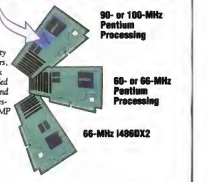

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DMI / from page 116

Micromanagement of the desktop

crosoft Corp., Novell Inc., and Sun Microsystems Inc., has developed DMI — a set of OS-independent services and APIs that let a manager at a central location manage desktop computers and their individual components.

In a sense, DMI provides an unprecedented degree of micromanagement capability for IS managers. Want to find out how much RAM a workstation has? What cards are in it? What display driver is installed? How much hard disk space is left? Whether it contains unauthorized software? DMI's "intelligent agents," implemented as resident software on workstations, make it easy to find out. DMI can even prevent pilferage of equipment by noticing when something has "disappeared" from a network station. DMI can also sound the alarm when a problem arises — for instance, when a printer runs out of paper. Microsoft is reported to have crafted an interface between DMI and Plug and Play, making a workstation's automatically obtained configuration information available to the network manager.

Although the capabilities of SNMP and DMI overlap, SNMP is likely to remain the preferred protocol for network management, while DMI shows promise as an API for the management and monitoring of desktop hardware.

DMI should gain some acceptance once it's built into operating system platforms such as OS/2, Unix implementations, and perhaps Microsoft's Windows NT. The DMTF has pledged that some DMI products will appear by December 1994. (See "DMTF readies first management spec," Aug. 1, page 1.)

One obstacle to DMI's acceptance might come from users — some may be reluctant to let IS managers poke around in the guts of their personal workstations.

Other products for network management

There are many other products for managing servers and clients on Novell Inc. NetWare LANs. Here is a list of several of them. We'll review some of these products in coming issues.

Network monitoring:
Sharp Inc.'s AlertView, The LAN Support Group Inc.'s BindView Network Control System (NCS), TouchStone Software Corp.'s CheckIt LAN, Network Computing Inc.'s LANAlert and LANExam, Horizons Technology Inc.'s LANtrack, Cheyenne Software Inc.'s Monitrix, and Novell's NetWare Management System (NMS).

Workstation management:
Triticom's Argus/n, McAfee Associates Inc.'s Brightworks and NetTools, LANExam, and Symantec Corp.'s Norton Administrator for Networks and Norton Utilities Administrator.

Software distribution:
AlertView, BindView NCS, Brightworks, NetTools, NMS, and Norton Administrator for Networks.

Inventory:
AlertView, Argus/n, BindView NCS, Brightworks, CheckIt LAN, Horizons Technology's LANauditor, LANExam, Monitrix, Magee Enterprises Inc.'s Network H.Q., and Norton Administrator for Networks.

Application metering:
Brightworks and Norton Administrator for Networks.

SNMP support:
AlertView, LANAlert, LANExam, and NMS.

Upcoming reviews:
Watch for our evaluations of Monitrix and Norton Utilities Administrator in the next few weeks.

Frye Utilities (Continued)

PERFORMANCE: SECURITY

Frye Utilities' tools rely for the most part on NetWare to provide user and file-level security. We did add access controls to some of the menus, but that was about it. Frye Utilities has added the capability to encrypt LAND databases; NEWS can log and monitor intruder detections and password expirations; there are new security screens in SUDS. These additions add few advanced security controls to the network. NetWare Management's new canned security reports showed us, for example, how many intruder log-in attempts had been made and the number of expired passwords. **Score: Good** (46.88).

DOCUMENTATION

Each of Frye Utilities' modules has an individual manual that describes that product. The manuals were written as stand-alone documents and, as such, contain all the information necessary to use that particular module. We liked the information in each manual describing how that module interacts with and complements other Frye Utilities products. Unfortunately, there is no master index.

All of the products include context-sensitive help, although in one instance, when we were building a report from LAND, we were told that we had made a mistake but weren't offered any help on how to fix it properly. The manuals contain only a minimal number of screen shots. **Score: Good** (62.50).

SUPPORT POLICIES

Frye Computer Systems provides unlimited free support and a toll-free number to registered users. Support hours are weekdays from 8:30 a.m. to 6 p.m. Eastern time. There's a company BBS and fax, but no on-line service forums such as CompuServe. Frye does not offer a money-back guarantee. **Score: Very Good** (56.25).

TECHNICAL SUPPORT

We found Frye Computer Systems' support staff to be courteous and quite helpful. Our calls were answered within 2 minutes, and we always found staff members knowledgeable. **Score: Very Good** (56.25).

VALUE

Frye offers a "buy what you need" approach to its network tools. The cost of all the Frye Utilities tools for our sample network (two servers and 100 clients) takes some addition: NetWare Management is $495 for the first server and $395 for the second; NEWS is also $495 plus $395 for two servers; LAND is $495 for the first 50 clients and $395 for next 100; SUDS is $995 for the first 50 clients and $895 for the next 100; and SMART is $495 per 100-user server. That makes a total price of $5,550.

Frye Utilities for Networks earned top (or tied for top) scores in more than half of our test categories. Administrators with modest needs can buy this set piecemeal, adding modules as their needs increase. You won't go wrong using one or all of these products.
Score: Very Good (75.00).

Company information: Frye Computer Systems Inc., in Boston, can be reached at (800) 234-3793 or (617) 451-5400; fax: (617) 451-6711.

LANDesk (Continued)

PERFORMANCE: SECURITY

LANDesk uses NetWare almost exclusively for its security; the only addition is when an administrator is remotely controlling a user's workstation. The desktop access module used a default security access profile for all users on the network, though it did allow us to change the profile for individual users. LANDesk creates no security logs, nor does it offer keyboard locking.
Score: Satisfactory (37.50).

DOCUMENTATION

Thanks perhaps to LANDesk's one-product integration, its documentation was much less intimidating than Saber LAN Workstation's or Frye Utilities'. There was a single users' guide, several small installation guides, and a problem-solving guide. We especially liked the problem-solving guide's approach to helping users work through specific problems — such as determining why a print job keeps going to the wrong printer, or finding a "chattering" network interface card.

The users' guide has a complete index and includes an ample number of screen shots. We were able to find the information we needed with very little effort. The context-sensitive on-line help offers most of the manual's content. LANDesk's documentation was the best organized of all the manuals we looked at.
Score: Very Good (75.00).

SUPPORT POLICIES

Intel provides unlimited free (but not toll-free) technical support to registered users weekdays from 7 a.m. to 5 p.m. Mountain time. A 900 number allows callers to go to the head of the queue. The toll-free fax-back service provides answers to common questions and information about patches and updates. Intel maintains a BBS and forum on CompuServe for on-line support. All Intel products offer a 60-day money-back guarantee.
Score: Very Good (56.25).

TECHNICAL SUPPORT

We found the Intel technical support personnel courteous and knowledgeable about the product. All of our calls were answered in less than 3 minutes.
Score: Very Good (56.25).

VALUE

At $2,990, LANDesk was the least expensive product that we tested. (It costs $1,495 per server.) LANDesk lacks software metering and distribution, however; if you need these you'll spend more on other products to fill in the gaps.

LANDesk focuses on real-time monitoring and diagnosing of common LAN problems, and it does that job well. If you want a well-integrated, inexpensive monitoring tool, LANDesk fits the bill. **Score: Good** (62.50).

Company information: Intel Corp., in Hillsboro, Ore., can be reached at (800) 538-3373 or (503) 629-7354; fax: (503) 629-7576 or (800) 525-3019.

LANlord and XTree Tools
(Continued)

PERFORMANCE: SECURITY

Each LANlord server has a password associated with it; this keeps intruders from accessing any workstation data. XTree Tools also adds passwords to the server monitor. For all other protection, LANlord and XTree Tools rely on NetWare's security features. Carbon Copy can lock a user's keyboard when it's being remotely controlled. There are no security logs. **Score: Good** (46.88).

DOCUMENTATION

LANlord's documentation consists of an installation manual, a users' manual, and a supplement to Carbon Copy. The manuals are well organized and include a liberal number of screen shots. A thorough index in each volume makes finding information relatively easy. All applications have on-line help and allow you to search by subject.

XTree Tools' documentation comes in a single three-ring binder and covers the product in great detail. XTree Tools offers on-line help, though it's not context sensitive. **Score: Good** (62.50).

SUPPORT POLICIES

Symantec provides a 60-day money-back guarantee and 90 days of free (but not toll-free) technical support. After that period you'll have to pay either annually or per call. Support hours are weekdays from 7 a.m. to 4 p.m. Pacific time. In addition to a company BBS and Internet access, Symantec maintains forums on CompuServe and America Online. There's a toll-free fax-back service providing access to technical notes, bulletins, product literature, and general information. **Score: Good** (46.88).

TECHNICAL SUPPORT

We reached the support staff within 3 minutes each time we called. The front-line personnel handled most basic questions, but our complex questions were passed on to other staff members. Staff members were courteous and helpful and either answered our questions or found us someone who could. **Score: Good** (46.88).

VALUE

LANlord is priced by client and cost $4,299 for our sample two-server, 100-node network; XTree Tools costs $1,390. That makes the total cost $5,689. You may also need to purchase OS/2 ($149) for the LANlord server.

The LANlord and XTree Tools combination tied for top scores (with Frye Utilities) in network monitoring, workstation management, and application metering. Some of XTree Tools' graphical views are superior to Frye Utilities', and LANlord has some metering features — such as licensing by group — that Frye doesn't match. On the other hand, LANlord has no software distribution utility and for now can't meter a one-user license. **Score: Good** (62.50).

Company information: Symantec Corp., in Cupertino, Calif., can be reached at (800) 441-7234 or (408) 253-9600; fax: (408) 446-9750.

Saber
(Continued)

Saber provides easily the best security protection. Using the Saber shell for Windows or the DOS menu system gave us complete control over each workstation on the network. We were able to easily set different levels of menu access by user, by group, or for everyone. The metering utility's secure mode was another strong protection. The password-protected screen saver would not allow us to get past it even when we rebooted the workstation; this provided a form of keyboard locking. There are no logs. **Score: Excellent** (75.00).

The manuals for LAN Workstation are somewhat intimidating. Nine books cover operations for the DOS and Windows environments. Finding the right book when you have a problem can be a challenge, though the Getting Started manual has a master index. We found a few errors in the manuals, such as the mention of the fact that the inventory doesn't run in NetWare's log-in script; the technical support folks acknowledged these problems.

On-line help was available for every program and, in the case of SaberBasic, provided the only information about the available functions. The Getting Started manual included a nice flowchart of actions for installing the software. Some of the manuals also used screenshots well. The manuals have been improved since our last review, but they still have a ways to go.
Score: Satisfactory (50.00).

Saber Software provides unlimited toll-free technical support to registered users. It has also added CompuServe and Internet access to its in-house BBS. Support hours are weekdays from 7:30 a.m. to 6 p.m. Central time. The technical support line has 24-hour voice mail, allowing you to leave messages when the company is closed. Saber offers a 60-day money-back guarantee on these products. The company also offers a publication, training courses, and a certification program.
Score: Excellent (75.00).

All of our phone calls were answered in less than 5 minutes, although we had to leave a message once. That call was returned within the hour. We found the technical support personnel at Saber to be courteous and knowledgeable. **Score: Very Good** (56.25).

LAN Workstation is priced by the node. The first node costs $199 and additional nodes are $49. Server Manager costs $695 per server, which brings the total for our sample network to $6,440, the highest price in this comparison.

The Saber combination provides solid tools, strong workstation management, and the best security features among these products. It's also got a full-featured scripting language. If top security and flexible software distribution are your priorities, Saber has what you need. **Score: Good** (62.50).

Company information: Saber Software Corp., in Dallas, can be reached at (800) 338-8754 or (214) 361-8086; fax: (214) 361-1882.

Summary
(Continued)

SECURITY

LAN Workstation provided by far the most comprehensive security features among these products. The secure mode of LAN Workstation's application metering — coupled with the DOS and Windows menus — gave us complete control over what programs could be executed on the network.

LANlord and Frye Utilities offered a few additional passwords. Frye's NEWS has a keyboard lock, for example. LANDesk relied totally on the NetWare security system.

DOCUMENTATION

LANDesk earned the top score for its manuals. We especially liked the problem-solving guide that steered us in the right direction for troubleshooting.

Frye Utilities and LANlord offer solid documentation. However, Frye Utilities could use an overall index to navigate the many manuals. LANlord's documentation erroneously suggests in one place that the OS/2 server can run on a 4MB machine. LAN Workstation's documentation suffers from sheer volume and the lack of a comprehensive index. We also found no written documentation covering the SaberBasic scripting language; that program's information was on-line.

SUPPORT POLICIES

Saber provides the strongest support policies we've seen for a LAN management package. Unlimited, toll-free technical support and multiple avenues to reach the company made it the winner. Frye provides toll-free support after you register but has no money-back guarantee nor major on-line services. Intel provides on-line access and a toll-free fax-back service for common problems. Support for LANlord and XTree Tools is now with Symantec Corp., which offers just 90 days of free support.

TECHNICAL SUPPORT

We found the technical staffs — with the exception of Central Point/Symantec's — able to answer our questions at the first level of support personnel. We had some problems with LANlord that required talking to a more experienced technician, who took care of us. In all cases the support technicians were courteous and helpful.

VALUE

The five Frye Utilities tools that we tested cost $5,550 for our sample two-server, 100-client network. These products are the best overall, either as individual packages for isolated functions or as a suite.

The least expensive product was Intel's LANDesk, which cost just $2,990. LANDesk's high points are its smooth integration and fine monitoring tools. Central Point's LANlord and XTree Tools cost $5,689. They excel in LAN monitoring, client management, and application metering.

Saber LAN Workstation and Saber Server Manager were the most expensive combination ($6,440) in this comparison. Saber was strong in workstation management and especially in security, where it was the best by far of these products.

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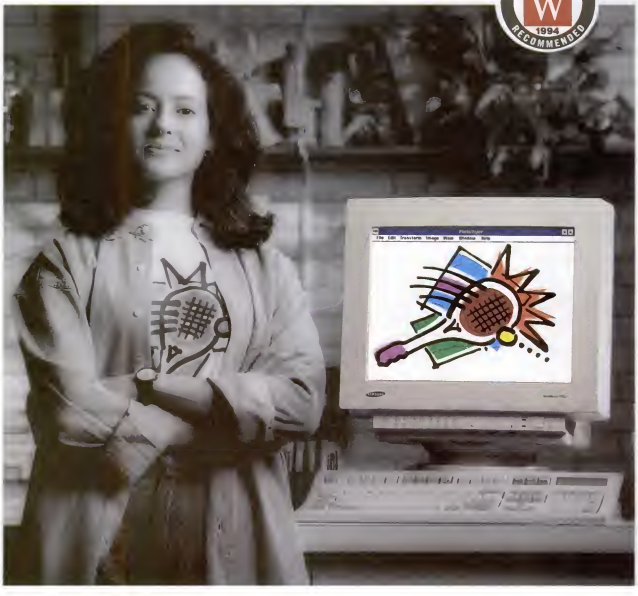

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REVIEWS

Improved mapping programs grow apart

MapInfo develops powerful toolset; Atlas offers impressive data files and a great price

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

TESTED BY ANA ORUBEONDO
TECHNICAL ANALYST

When we last looked at the two leaders in the desktop graphical information systems (GIS) market, MapInfo Corp.'s MapInfo for Windows 2.0 nosed out Strategic Mapping Inc.'s Atlas GIS for Windows 1.0 for the top score by only one-tenth of a point. (See "Atlas GIS makes promising Windows debut," March 7, page 85.)

Now both programs are out in new versions and are stronger than ever. Their capability to manipulate data and display the results on maps makes them ideal for a host of uses, from designing relatively simple locator maps to performing sophisticated market analyses and site selection operations.

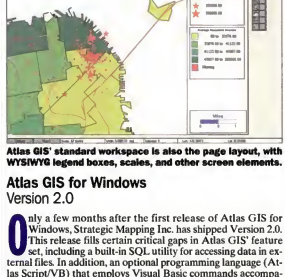
Atlas GIS 2.0 and MapInfo 3.0 offer remarkably similar feature sets, but they are beginning to differentiate themselves more clearly in the marketplace. Atlas GIS now costs less than half as much as MapInfo. This factor, combined with Strategic Mapping's broad offering of up-to-date data files, gives Atlas GIS a small edge over MapInfo in this head-to-head review. For pure mapping functions, however, MapInfo offers a stronger toolset.

MapInfo is the "power mapper's" choice. If you want to create maps from scratch and modify map elements, MapInfo is the better product. With built-in digitizer support and the capability to change the shapes of map objects, MapInfo provides editing capabilities that are lacking in Atlas GIS. MapInfo leads in designing reports and has more options for thematic representations of data.

If, on the other hand, you're looking for an *easy-to-use* program for applying powerful query and thematic tools to map data, Atlas GIS has the advantage. The program's centralized layer utility is a paragon of efficiency, and Atlas allows you to edit most map layers without having to first mark them as editable, as MapInfo requires.

Atlas GIS also offers a smooth ramp up to Strategic Mapping's high-end Conquest databases of marketing and demographic data. For many users of desktop GIS programs, the key issue in selecting a program is not so much the program's capabilities as the data that can be used with it. Both Strategic Mapping and MapInfo Corp. offer dozens of databases of demographic data and other types of information. Strategic Mapping offers somewhat more extensive and more current data than MapInfo. Which vendor ultimately provides the more attractive data, however, depends on what you need and how often you will need it updated.

Patrick Marshall is president of Cascade Information Technologies, a consulting firm in Seattle.



Atlas GIS' standard workspace is also the page layout, with WYSIWYG legend boxes, scales, and other screen elements.

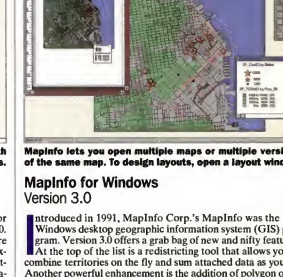
Atlas GIS for Windows
Version 2.0

Only a few months after the first release of Atlas GIS for Windows, Strategic Mapping Inc. has shipped Version 2.0. This release fills certain critical gaps in Atlas GIS' feature set, including a built-in SQL utility for accessing data in external files. In addition, an optional programming language (Atlas Script/VB) that employs Visual Basic commands accompanies Version 2.0, and there's an optional OLE-compatible toolkit for embedded mapping in other applications.

These enhancements, plus a host of other less dramatic improvements, have made Atlas GIS a serious competitor to MapInfo Corp.'s MapInfo. MapInfo is still superior in power, at least for those who want to create maps from scratch and reshape complex map objects. But Atlas GIS is easier to use for basic query operations and thematic mapping, thanks to its well-designed dialog boxes and, especially, its centralized layer-management utility. And at $495, Atlas GIS is $800 less expensive.

INSTALLATION AND CONFIGURATION:
The stand-alone setup program offers a dialog box that clearly displays the amount of disk space required and the amount available on the currently selected drive. The program also allows you to selectively install files. The total disk space required for a complete installation is just over 21MB. Installing to a serv-

See ATLAS, page 124



MapInfo lets you open multiple maps or multiple versions of the same map. To design layouts, open a layout window.

MapInfo for Windows
Version 3.0

Introduced in 1991, MapInfo Corp.'s MapInfo was the first Windows desktop geographic information system (GIS) program. Version 3.0 offers a grab bag of new and nifty features. At the top of the list is a redistricting tool that allows you to combine territories on the fly and sum attached data as you go. Another powerful enhancement is the addition of polygon overlay tools, which let you use a region on one layer to split or combine regions — and their data — on another layer. MapInfo also now allows you to attach raster images to maps as backgrounds.

The program's interface has been worked over, so most utilities have easier-to-understand dialog boxes and many processes offer step-by-step procedures. Also, there's a new set of floating toolboxes, as well as a nifty text-rotation tool.

If you're going to be doing a lot of map creation and editing, MapInfo is clearly the better program, thanks to its capability to accommodate complex objects, to reshape those objects, and to create maps from scratch using a digitizer.

INSTALLATION AND CONFIGURATION:
If you have a CD-ROM drive, you can do an unattended install and leave MapInfo's 7MB of sample files on disc. Unfortunately, there's no information about how much space is required for the installation or available on each drive. A full installa-

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New mapping test plan based on common tasks

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

High-end desktop mapping programs are complex applications designed to accommodate a wide range of mapping needs from the simple to the complex — in some cases even including topographical analysis.

With this new test plan we moved from a feature-oriented test suite to one based on common user tasks, in which we stressed only those features that help users complete typical tasks. We paid close attention to whether the interface made operations intuitive or got in the way. In each of the task categories, we evaluated not only whether the program could accomplish the task, but also its ease of performance.

Our performance tasks were installation and configuration; map creation and modification; data query and display; advanced data operations; spatial queries; geocoding; reporting; availability of maps and data; expandability; import and ex-

port; and speed. We also evaluated documentation, support policies, technical support, and value.

We tested features and usability on a 66-MHz 486 system with 16MB of RAM. We ran our benchmarks in the Test Center on a Gateway 2000 Inc. 486/66 with 16MB of RAM, running MS-DOS 6.2 and Windows for Workgroups 3.11. Our printer was a Hewlett-Packard Co. HP LaserJet 4 with 4MB of RAM.

INSTALLATION AND CONFIGURATION:
We checked how easy it was to install each program and how much disk space was required. In addition, we looked for network capabilities and customization features. We noted, for example, whether the user could modify the toolbar's location or content or both and whether the display could be altered and saved. We also looked for password protection.

To receive a score of satisfactory, the

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ATLAS / Version 2.0

from page 123

er and onto workstations follows basically the same process.

Many of the data files and maps provided for use with Atlas GIS come on CD-ROM. Unfortunately, with the compressed street-map files on the single-CD version we received from Strategic Mapping, we couldn't leave the data on the CD and use it. Instead, we had to copy the files we wanted to a local drive. If you want to leave the data files on the CD-ROM, you have to purchase the CD version with uncompressed files.

On the plus side, Strategic Mapping makes it easy to select and copy files. When copying street maps, for example, you're offered the choice of selecting files by state, by market areas, or by counties.

Atlas GIS is relatively customizable. We found controls for setting the zoom tool's factor, minimum and maximum sizes for labels on maps, and how the selection tool selects objects.

Atlas GIS consumed only 10 percent of our system resources when loaded. The program doesn't provide password protection or an uninstall utility.

We rate Atlas GIS good in installation and configuration.

PRODUCT SUMMARY

Atlas GIS for Windows

VERSION 2.0

Company: Strategic Mapping Inc., in Santa Clara, Calif., can be reached at (800) 472-6277 or (408) 970-9600; fax: (408) 970-9999.
List price: $495 for stand-alone copy; $1,195 for three users, $3,495 for 10 users.
Requirements: Intel 386 or compatible system (486 recommended) with 4MB of RAM (8MB recommended); 20MB of disk space; Windows 3.1 or later, DOS 3.1 or later (5.0 or later recommended); Windows-compatible pointing device.
Pros: Easy to use; multiple map layers can be edited; flexible buffering tools; broad array of data available; terrifically low price.
Cons: Can't reshape map objects; awkward labeling; limited nodes for map objects; no digitizing interface.
Summary: Atlas GIS for Windows is both easier to use and less expensive than MapInfo. It also has a larger number of data sets, which are more up-to-date.

On the plus side, Strategic Mapping makes it easy to select and copy files. When copying street maps, for example, you're offered the choice of selecting files by state, by market areas, or by counties.

Atlas GIS is relatively customizable. We found controls for setting the zoom tool's factor, minimum and maximum sizes for labels on maps, and how the selection tool selects objects.

Atlas GIS consumed only 10 percent of our system resources when loaded. The program doesn't provide password protection or an uninstall utility.

We rate Atlas GIS good in installation and configuration.

MAP CREATION AND MODIFICATION:

Atlas GIS emphasizes ease of use over power features in its tools for creating and modifying map elements. For starters, Atlas GIS for Windows doesn't support digitizing tablets. Strategic Mapping will send a free copy of Atlas GIS for DOS to owners of the Windows version who want to digitize maps. This is, of course, an awkward solution requiring two interfaces and extra disk space.

Merging two regions into one was very easy. The task was made even easier by Atlas GIS' capability to select objects on any map layer without having to first specify that layer as selectable or editable, as MapInfo requires.

Drawing new objects, such as the lake in our test plan, was also simple. In fact, you can choose from two "freehand" layers for drawing: a Map Freehand layer and a Page Freehand layer. If you're drawing an object that should be scaled with the map (so that when you zoom in it is resized appropriately), you use the Map Freehand layer.

Objects drawn on the Page Freehand layer are linked to the page coordinates instead of map coordinates to retain their size and location in relation to the page.

Atlas GIS offers more flexibility than MapInfo in controlling basic drawing elements, allowing you to choose from 46 line styles, which can be drawn in widths that are virtually unlimited. That means, for example, that you can create street lines sufficiently wide to accommodate labels inside the street, a trick we were unable to perform in MapInfo.

Atlas GIS makes it extremely easy to change the style of map elements, as the program allows multiple layers to be edited simultaneously. It also provides a central utility for controlling map layers and their styles of objects.

The Layers & Themes utility has radio buttons for summoning five sets of controls: Visibility, Layer Info, Style, Labels, and Theme. The Visibility controls make it simple to set a range for the visibility of the layer and of labels.

We found Atlas GIS' labeling feature to be very awkward to use. Unlike MapInfo, which provides a tool that you can use to attach a label to any object you click on, with Atlas GIS you turn labels on or off for an entire layer. The Layers & Themes function offers controls for setting how labels will be displayed. You can, for example, determine how far from its object a label should be offset, as well as the scale range within which the label should be visible.

When you activate the Labels layer you can select individual labels, so you can clean things up by deleting all but those you really want. You can also easily move and resize labels by moving the drag handles with your mouse.

Performing our map-cropping task was a bit of an involved process, though not quite as tough as with MapInfo.

Atlas GIS doesn't let you attach a raster image to map coordinates as MapInfo does, but you can easily attach raster images, vector images, video clips, text, or any other launchable file to fields in tables.

The program supports a broad variety of map projections, including standard conformal and equal-area projections, as well as the U.S. State Plane Coordinate System.

Atlas GIS has a relatively lower capacity — 4,000 nodes — for complex objects. You can import more complex objects using a "thinning" utility, but you will not be able to display an object with more than 4,000 nodes.

Atlas GIS lacks MapInfo's flexibility in map creation and modification, particularly in Atlas' incapability to reshape lines and split regions. But the program picks up points for its ease of use in per-

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MAPINFO / Version 3.0

from page 123

tion occupies 11MB of disk space. It can be installed easily on a network server.

This version of MapInfo offers a new Preferences utility that provides useful control over how the program is displayed and how it behaves.

MapInfo relies on three floating toolboxes: one for drawing tools, one for navigating and accessing utilities, and one for calling up MapBasic features. You can place the toolboxes anywhere on the screen and reshape them, and MapInfo will remember their locations.

The program consumed 17 percent of our system resources when we loaded it, nearly twice that required by Strategic Mapping Inc.'s Atlas GIS.

Configuring the program was very easy, but its relatively heavy resource consumption and the limited information it provides users during installation holds its score at satisfactory.

PRODUCT SUMMARY

MapInfo for Windows

VERSION 3.0

Company: MapInfo Corp., in Troy, N.Y., can be reached at (800) 327-8627 or (518) 285-6000; fax (518) 285-6060.
List price: $1,295 for stand-alone copy; multiuser prices are negotiable; MapBasic costs $795.
Requirements: Intel 386 or compatible system with 4MB of RAM (8MB recommended), 12MB of disk space; Windows 3.1 or later; Windows-compatible pointing device.
Pros: Strong creation and editing tools; broad variety of thematic options; multilayer querying; flexible reporting.
Cons: Relatively hard to learn; can't query external databases; small set of symbols.
Summary: MapInfo is the stronger mapping program per se. If you need to frequently create, edit, and manipulate maps, then this is the product to use.

MAP CREATION AND MODIFICATION:

Creating and editing maps is one of MapInfo's strengths. MapInfo provides a built-in digitizing interface, with a generic driver that supports most devices, as well as drivers for Summagraphics Corp. and GTCO Corp. digitizers. Third-party drivers are available for other digitizers.

MapInfo handled our tests with ease. Creating a larger region out of two smaller ones is performed by simply selecting the two regions and then choosing Objects/Combine. The option-filled dialog box that appears next is a bit confusing to new users, but it's easy to use once you've seen it a few times.

The procedure is similar for splitting regions, except that you must select or create a region on another layer to indicate where the first region should be split. Just as MapInfo allows you to combine data when combining regions, the program allows you to split the data attached to the object if you like.

Even better, MapInfo's new Set Target command lets you perform combining and splitting operations on regions across layers; you can combine regions on one layer to create a new region on another layer. Similarly, you can divide an object on one layer using a region on another layer as a "cookie cutter." The same tools will work on lines, polylines, and arcs. And, unlike Atlas GIS, MapInfo allows you to not only move but also reshape any object.

Among MapInfo's other special object-manipulation tools are those for smoothing polylines, and utilities for breaking regions into polylines and combining polylines into regions. MapInfo doesn't offer a snap-to-grid option, but it offers something that many map creators will find even more useful: a snap-to-node capability, which makes it easy to line up borders of objects.

Like Atlas GIS, MapInfo provides a centralized layer utility for modifying map objects. But MapInfo's utility isn't quite as easy to use. On the plus side, this version of MapInfo provides a Layers icon for the toolbox to make the utility easier to summon. You can edit only one layer at a time, however, unlike with Atlas GIS, which lets you select and edit most map layers at will.

We also found MapInfo to be somewhat more limited in certain object styles than Atlas GIS. Lines, for example, are limited to 10 points in width. MapInfo offers only 37 different predesigned symbols, a small figure compared with Atlas GIS' 186. On the other hand, MapInfo provides 76 different line styles, far more than the 46 lines offered by Atlas GIS.

MapInfo is very flexible in handling labels. Not only can you automatically label all objects on the layer, but you can label objects individually. Version 3.0 has new drag handles for rotating labels.

We performed our task of cropping a map only with many steps and great patience. First you have to select the features from each layer individually and save them to a new table. Then you create your new "cropped" map by opening those tables.

Version 3.0 has also added the capability to attach raster images to maps. The program can handle .GIF, .JPG, .TIF, .PCX, .BMP, .TGA, and .BIL (SPOT satellite images) formats.

Like Atlas GIS, MapInfo supports a wide variety of map projections, including variations of conformal and equal-area projections, as well as U.S. State Plane Coordinate Systems.

MapInfo can handle objects of more than 32,000 nodes; Atlas GIS is limited to objects of 4,000 or fewer nodes. Although 4,000 nodes, or vertices, is enough for most information mapping purposes, MapInfo's greater capacity makes importing and manipulating complex maps easier. Although MapInfo could be easier to use, its map creation and editing tools are a notch above those of the competition. We rate MapInfo's map creation and modification very good.

DATA QUERY AND DISPLAY:

Opening our test files in MapInfo was easy. After you save a set of open files as a named work space, you can open the

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HOW WE TESTED / from page 123

New mapping test plan uses common tasks

program had to install without mishaps or ease-of-use problems. To receive a score of good, the program needed to provide information regarding the disk space required and available, and had to allow us to choose a drive for installation. To receive a score of very good, the program had to be customizable and, if it was a Windows program, had to provide an uninstall program. We also noted whether the program made heavy demands on Windows resources.

Programs earned extra points for special features, such as allowing installation of the program from CD-ROM or the option to leave sample data or other program elements on CD to save disk space.

MAP CREATION AND MODIFICATION:

We tested each program's capability to create new maps from scratch and to modify map elements, such as polygons, lines, and points.

We created a map from scratch by employing a digitizing tablet to trace a hardcopy map, noting the breadth of digitizer support, and the ease of establishing coordinates and of selecting a map perspective.

Next, using a map supplied with the program, we attempted to make the following changes in map elements:

- Merge two regions to create a larger region out of two smaller ones.
- Split a polygon in two to create smaller regions out of a larger region.
- Reshape a line and a polygon.
- Draw a new polygon element representing a lake.
- Change the colors of map elements.
- Attach labels to several map objects.
- Set the viewing level of map elements and labels.
- Crop the map and its data, and save it as a new file.
- Change the map's projection.
- Attach a raster image to a point on the map.
- Lay a raster image in the background and line it up to data coordinates.

To earn a satisfactory score, the program had to let us create map objects, including regions, lines, and points, and change the styles of map objects. To receive a score of good, the program had to let us merge two regions into one larger region. For a score of very good, the program had to let us reshape map objects. Programs received extra points if they were exceptionally easy to use or provided additional capabilities, such as letting us attach raster images to our maps.

DATA QUERY AND DISPLAY:

In this task we examined each program's basic capabilities to query and display data on maps. First we opened a state map, a ZIP code boundary file, and a street-level map file, noting the ease of opening these files. After attaching two separate data files to the map — one file with demographic data and another with data on retail sales by our chain of electronics stores — we attempted to do the following:

- Do a simple calculation on one of the map attributes. (We selected all ZIP code areas where the residents had an median age above 27.)
- Create a bivariant thematic map. (One variable was average household income, displayed by varying colors of ZIP code areas. The other variable was the annual sales of our hypothetical stores, displayed as point symbols of varying sizes.)
- Pan the map.
- Move to a specific ZIP code.
- Create a live (editable) inset in the same map, using the same open data but displaying a different thematic analysis.
- To earn a satisfactory score, a program had to let us perform all the tasks, with the exception of creating inset maps. To receive a very good score, the program had to also support inset maps. Programs received extra points for easy-to-use features or additional useful query and display capabilities.

ADVANCED DATA OPERATIONS:

This task tested each program's database and advanced analysis tools.

First we used each program to generate a new 100-record database of clients in the Seattle area; each record had seven fields. Next we performed two operations on the database records: running a multivariable query and creating a derived field. We then attempted to merge the data file with a second data file. Finally, we examined each program's capability to query external databases, either directly or via SQL.

In the derived field test, the table held a column for 1993 population data and a column for 1990 population data. We queried the database to subtract the data in the second column from the data in the first column and put the results in a new column labeled "Population growth, 1990-1993."

To receive a score of satisfactory, the program had to complete all the tasks, with the exception of creating a derived field and performing the external SQL query. To receive a score of good, the program had to be capable of creating derived fields. To receive a score of very good, the program had to support external SQL queries.

SPATIAL QUERIES:

In examining each program's capability to perform spatial queries, we attempted these operations:

- Search for named objects: ZIP codes, counties, highways, etc.
- Perform a radius search on multiple data points.
- Perform a polygon search on multiple data points.
- Create a buffer around a highway for queries.
- Perform a multilayer query that involved splitting a ZIP code area.
- Perform a "build to value" operation, expanding an area around a point until the data within the area attained a specified level.
- Balance sales territories. (We enlarged the size of a sales region until it contained a specified amount of data, such as customer sites.)
- Measure a distance.
- Select all areas adjacent to a selected area.
- Perform a point aggregation and a multilayer, area-weighted aggregation, noting the methods employed by the program. (Point aggregation is the shading of regions according to the numbers of specified points they contain. Multilayer, area-weighted aggregations are the same as point aggregations except that they are done on multiple layers, assigning each layer a different weighting and then displaying the results. You might, for example, display proximity to highways on one layer, household incomes on another, real estate costs on a third, and so on.)

To receive a score of satisfactory, the program had to support each of the tasks, with the exception of these operations: multilayer area-splitting, building to a value, territory balancing, and area-weighted aggregation.

To earn a score of good, the program had to support multilayer area-splitting operations. Programs could earn extra points for providing additional capabilities, such as line-of-sight analysis or global positioning satellite (GPS) capabilities. A score of excellent required the program to easily handle all the tasks.

GEOCODING:

We attempted to geocode our 100-record database of clients using two methods: address matching and ZIP+4. (The address matching method matches the address in your database to actual street addresses on the map. ZIP+4 matching is slightly less accurate, matching addresses to the nine-digit ZIP code boundaries instead of to exact addresses.) We noted other supported methods and checked whether the program allowed progressive passes employing different geocoding methods.

To receive a score of satisfactory, the program had to provide geocoding capabilities. Exceptionally easy operations or extra capabilities, such as multipass, multiple-criteria geocoding, earned additional points.

REPORTING:

In this task we examined each program's control over printing maps and other elements, such as graphs, charts, and legends. We created a map report, examining the control the program provided over selectively printing map data and features, as well as over formatting (including adjusting fonts and colors) and annotating the map features. Next, we attempted to include in the printed report a table showing data from a radius search. We also created a chart to accompany the map, noting the variety of chart types provided and the ease of modifying charts.

A score of satisfactory required the program to provide basic formatting control over printing maps, including margin and font adjustments. Programs earned extra points for providing batch reporting, report catalogs (libraries of report formats), and other special capabilities. A program earned a score of very good or higher only if it allowed us to include tabular data in the report.

AVAILABILITY OF MAPS AND DATA:

In this category, we examined the maps and data files provided with the program, as well as additional maps and data files available at extra cost. We noted not only the breadth and depth of available data and maps, but also the currency of the files. We also noted the granularity (level of detail) of the demographic data provided.

We scored this category broadly, reserving a score of excellent for vendors that provide all the maps and data that users might want to employ with the program. The more data included with the program, the higher the score we awarded.

EXPANDABILITY:

In this category we examined the ways in which the programs could be extended, including using them across platforms, developing custom interfaces or interface elements with the application's programming language, and offering compatibility with lower or higher end versions of the program, real-time hooks for GPS, and foreign-language versions.

To receive a score of satisfactory, the program had to include (or offer as an extra-cost option) a programming language to customize the program and build applications. Programs could earn higher scores by providing multiple compatible platforms, or ramps to lower and higher end applications or similar capabilities.

IMPORT AND EXPORT:

In this category we examined the file formats supported by each program for import and export. To receive a score of satisfactory, the program had to be capable of opening dBase, Lotus 1-2-3, and Microsoft Excel files. To receive a score of good, the program had to allow us to import files in a public-domain format, such as Tiger files. Support for other file formats raised the score.

SPEED:

From survey results we have found that the relative speed of operations in mapping software is not very important to users. In addition, the two products reviewed were very close in performance. We loaded each program's map for Washington state, the state ZIP code boundaries, and street maps for our benchmark tests. We timed the following operations:

- redrawing the screen after changing one variable in the map;
- panning and rotating the view;
- zooming to a set level;
- loading a work set containing a map and two data files;
- combining two layers of a map into a unique third layer; and
- printing a map.

To receive a score of satisfactory, the program had to perform all tasks in an adequate period. We awarded higher scores for faster operations.

DOCUMENTATION:

The scores reflected the quality and comprehensiveness of the written and on-line documentation.

To merit a satisfactory score, the documentation had to describe the product and how to use it, and include a table of contents and an index. A product earned extra points for a quick-start guide, a tutorial, on-line help, quick-reference card, or other useful material.

SUPPORT:

Support policies: Vendors who offered unlimited free support for their products received a satisfactory score. We awarded extra points for money-back guarantees, toll-free lines, BBS and fax support, extended support hours, customized corporate support plans, and the availability of extra training for a fee. Vendors lost points for limited support or no support at all.

Technical support: We based scores on the availability of technicians and the quality of service we received during the course of multiple anonymous calls. Long waits on hold or for return calls lowered the score.

VALUE:

Our value scores reflected the list price vs. the total score of the other categories, taking into account the competition.

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forming basic operations, thanks especially to its capability to select and edit objects on multiple layers simultaneously. We rate map creation and modification good.

DATA QUERY AND DISPLAY:
Aside from one limitation — the inability to display more than one map window on screen at a time — we found Atlas GIS to be flexible and very easy to use for querying and displaying data.

The program works with three basic types of files: geographic, data, and project. When you open a data file separately you're asked whether it should be linked to a geographic layer and what the key column should be for making the connection. When you have opened the map and data files that you want, you can save them as a project.

The lion's share of credit for the ease of querying and displaying data goes to the program's intuitive centralized Layers & Themes utility and the nicely designed expression builder.

There's also a Find command on the menu that we used to locate a specific named feature, a ZIP code, or an address on a specified layer. The tool is, however, not quite as flexible as MapInfo's.

Atlas GIS makes displaying data thematically nearly as easy. The controls are all accessible through Layers & Themes. When you select the Themes radio button, up pops a concise set of controls for one or two variables.

Having selected the range fill option, we then selected the expression builder button to specify the data we wanted to display. Finally, we clicked on Ranges to design the fill. Atlas GIS makes it simple to select the method, offering eight options, and you can quickly and easily change colors, patterns, and the numbers of steps in the range.

Atlas GIS' tools for navigating the map are more than adequate, although they violate some Windows conventions. The zoom and pan tools, for example, only work one, unlike in image-editing programs, for example. You can set the tool to remain active for multiple zoom operations by double-clicking on it, but there are no cues to tip off the user to this trick.

Although Atlas allows just one map set to be open at a time, it does let you call up as many as three insets.

Atlas GIS doesn't offer quite the range of thematic options that MapInfo does, but it's easier to use and its variety of symbols provides greater flexibility. Its basic query tools are also straightforward and easy to employ. We rate Atlas GIS good in data query and display.

ADVANCED DATA OPERATIONS:
With its 59 functions and 22 operators, including Boolean and nesting commands, we found Atlas GIS fully up to the task of constructing complex multivariable queries. Just as with simple queries, the program's expression builder allows you to assemble advanced arguments using your mouse. The only data that need to be entered manually are values.

The program allows you to open multiple tables, but you can query only one at a time, and the database is not relational; thus you can't share data columns in various tables, as MapInfo allows. (You can use the separate SQL utility for this.)

With Version 2.0, Strategic Mapping bundles SQL tools for querying external databases; the program uses Q+E Software Inc.'s Q+E as its SQL query builder. We encountered no uncxpected problems. The results of SQL queries are dumped into an Atlas GIS table for viewing and manipulation. Atlas GIS provides a strong set of tools for internal database operations.

You can also create new tables with as many as 254 columns from within the program and can redefine existing ones. Adding new records is a bit tedious with Atlas GIS' built-in tools, however.

If you want to save the results of a query to a table, all you have to do is create a new column in the table, then use the Calculate Column command to perform the operation. Our task of creating a derived column of data was accomplished in short order in this fashion. We rate Atlas very good in advanced data operations.

SPATIAL QUERIES:
Atlas GIS offers a strong set of spatial analysis tools, from simple ones for measuring distances to data-driven buffers that can perform multilayer calculations.

The simple operations are appropriately simple to perform. To measure a distance, you just select the ruler tool from the toolbox, click on the beginning point, and drag to the end point.

Radius searches are also very easy to perform. You simply select the layer or layers you want to search, then activate the radius search tool. The polygon search tool works in a similar fashion.

Creating buffers is a snap. Just select the object or objects you want to buffer, click on Map/Create Buffers, choose the layer that has the objects you want to buffer and make sure the Selection box is checked, and you're on your way. Atlas GIS also made short work of performing our point aggregation task.

Atlas GIS can't match MapInfo's new capability to analyze the interaction of polygons on different map layers, but Atlas GIS offers some of the same capabilities by allowing you to use buffers to split objects, and the data they contain, in other layers. A typical task might be determining the number of households within a specified radius of a store.

Atlas GIS' buffers are unusually flexible compared to the competition's. You can generate multiple buffers that can be operated upon independently or in combination.

Atlas GIS also offers "variable distance buffering." Instead of entering the width of the buffer, you specify a column in the table of the layer being buffered and the objects' buffers vary according to the value in that column.

This capability to generate data-drivcn buffers is not, however, quite the same as the ability to perform build-to-value operations, in which you specify a value and build a buffer around an object or location until it contains the specified number (for example, a buffer of houses around a store). This limited Atlas GIS' flexibility in balancing sales territories; we had to do the balancing by trial and error. (The vendor offers an extra-cost script that handles build-to-value functions.)

Atlas GIS offers intuitive spatial analysis with flexible and powerful buffering tools, though it (and MapInfo) lacks the advanced spatial and topographical tools of higher end programs. We rate Atlas GIS' spatial queries good.

GEOCODING:
Atlas GIS' geocoding capabilities are much improved in Version 2.0. The program is very flexible at handling addresses. You can geocode either by address or, more simply, by ZIP+4 code. If you geocode by address, you can instruct the program to employ any or all of four address-matching methods. If the match can't be made using the most precise method, the program will attempt to match the record using the next method.

Atlas GIS also allows you to "relax" any of five criteria to increase the match rate, including direction designation on streets (north, south, east, west type, street name, house number, and ZIP code. Of course, employing relaxation options increases your chances of incorrect matches.

You can perform the geocode operation in either batch or interactive mode; the latter is preferable if your hit rate is low and you frequently need to edit records to succeed in matching.

In our tests, Atlas GIS failed to find matches for four of our small sample of 100 company addresses. We were able to approximate the locations for these records using the program's fall-back methods.

Unlike MapInfo, Atlas GIS can geocode an unlimited number of addresses in multiple counties or states in a single pass. That's because Strategic Mapping has separated the geocoding information from the street files. The result is that you don't need to load map files to perform geocoding, and all geocode information can fit on one CD-ROM disk. We rate geocoding very good.

REPORTING:
Atlas GIS' reporting capabilities remain limited in Version 2.0. The program doesn't allow you to print data from tables directly as reports, nor is there any way to include either charts or tabular data on map screens for printing.

On the plus side, the program can now display as many as three inset versions of the current map, and you can attach video, graphics, and text files to table fields.

The program's basic formatting tools are solid and easy to use. Screen elements can be toggled on or off. Once you've decided which elements you want on screen, designing your page for printing is easy. The program also includes eight customizable templates that you can employ to quickly change on-screen and printed formats.

Atlas GIS allows you to tile maps to print portions of a map on multiple sheets; this lets you print large maps on small-format printers.

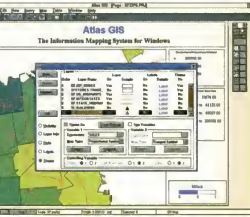
Atlas GIS' reporting score is limited by the program's inability to include statistical and table data and charts in printed reports. Atlas GIS' reporting earns a score of good.

AVAILABILITY OF MAPS AND DATA:
Strategic Mapping bundles a great deal of sample data with Atlas GIS, and a very broad selection of additional maps and data is available at extra cost.

The basic program includes maps for the states and counties of the United States, 5-digit ZIP code centroids (center points), major U.S. cities, and interstate highways. Also included are Canadian provinces and territories, major Canadian cities, countries of the world, world capitals, and major cities.

In addition, users will receive five other files when they register the program: 3-digit ZIP code areas, U.S. telephone area codes, U.S. Metropolitan Statistical Areas, U.S. Areas of Dominant Influence, and U.S. Designated Market Areas.

Strategic Mapping also offers the broadest set of optional demographic, economic, and financial data we've seen. The company's line of Conquest Market-Data products, for example, offers dozens of data categories defined down to household levels, much of it as current as 1994 and updated yearly or more frequently. We rate the program's availability of maps and data very good.



Atlas GIS' Layers utility controls nearly all aspects of the layer, including symbol types and thematic displays.

EXPANDABILITY:
The inclusion of Atlas Script/VB means that owners of Atlas GIS now have access to tools for customizing the program and creating new applications. Those users who already know Visual Basic will be very much at home in Atlas Script/VB's compatible environment.

Atlas GIS doesn't, however, match MapInfo's cross-platform support, because it comes only in Windows and DOS versions. Nor does Strategic Mapping offer Atlas GIS in foreign-language versions.

To its advantage, Atlas GIS belongs to a family of products designed to accommodate different goals in an enterprise. Atlas Map Viewer, an OLE product, essentially serves as a map reader and data analyzer, lacking certain Atlas GIS advanced capabilities. At the high end is Conquest, an extensive market database that employs Atlas GIS as a mapping interface.

There's also an extensive library of custom applications and scripts available, provided both by Strategic Mapping and by third parties. Atlas GIS earns a score of very good in expandability.

IMPORT AND EXPORT:
Atlas GIS' capabilities are unchanged since the previous version. The program uses dBase as its native file format; you can read and edit any files in that format.

In addition, you can import Excel, Lotus 1-2-3, and tab-delimited and comma-delimited ASCII files. The program can export only ASCII formats.

An extra-cost module — Atlas Import/Export for $795 — imports and

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entire set at once.

Basic navigation and querying operations are very easy to perform in MapInfo. The pan tool makes it easy to move the map within a window, and you have the option of displaying a scroll bar on the map window.

Unlike Atlas GIS' Find command, MapInfo's Find can be used to search any table on any column. The program prompts you to pick a symbol to mark found items, and if there is no match for your search term, MapInfo offers a list of alternatives. After finding a match, the program pans to the found object.

You can refine your search by specifying a region in another layer within which the object must reside. For example, if you were searching for a street that had multiple segments, you might specify that you're searching for the street wherever it occurs within a specified ZIP code or census tract.

MapInfo offers similar power and flexibility when it comes to creating queries. If you're not familiar enough with the search terms and syntax to enter the query argument directly into the provided field, you click on the Assist button to summon the query builder.

MapInfo made short work of our thematic mapping task. Rather than providing a centralized dialog box for creating thematic maps, MapInfo leads users through a series of dialog boxes for creating them. Although we found the method employed by Atlas GIS more intuitive, MapInfo's procedure presented no hurdles and helped us through the many specific questions that we faced. Once the map is completed, there's a preview of the finished map.

To create our sample map we selected Map/Create Thematic Map. The program then popped up a chart of the available thematic types. MapInfo offers only six ranging methods, compared to Atlas GIS' eight, but the most popular methods are there.

But if MapInfo requires more steps to do the job, it also offers more choices in creating thematic maps. MapInfo doesn't limit the number of variables you can map for a single layer. In addition to the usual range, dot density, and proportional symbol maps, MapInfo provides two types of thematic maps not offered by Atlas GIS: column graphs and pie charts.

MapInfo is somewhat more difficult to learn and use than Atlas GIS, but its basic querying tools and its versatility to generate thematic maps are more powerful and flexible. MapInfo earns a very good score in data query and display.

ADVANCED DATA OPERATIONS:

MapInfo's database tools are strong, though not quite as flexible or accessible as those of Atlas GIS. MapInfo provides only 32 functions and 22 operators. The available functions and operators in the Select utility were, however, more than up to the task of performing our test multivariable queries.

Among MapInfo's operators are five that let users enter spatial arguments along with logical arguments. By comparison, Atlas GIS makes you perform equivalent operations in a separate step.

Besides the Select utility, MapInfo also offers a SQL query builder, called SQL Select. Despite its name, however, SQL Select is not for querying external database files. To do that, you'll need the optional SQL DataLink module. SQL Select can perform advanced database operations, such as joining tables and deriving fields, on internal tables.

We found it easy to perform our task of deriving a column for population growth. If you want the result to be permanent, you first create a column in the table to hold the data, then employ the Tables/Update Column to specify the columns to operate on and the expression for the operation. If you don't want to keep the derived data permanently, you can do the query using the SQL Select utility, which also supports cross-layer querying ("subselecting" in SQL terms).

MapInfo has the same basic capabilities for table creation as Atlas GIS, but it makes the process of creating tables and adding records a bit harder to learn and more tedious to perform. Once we located the utility, defining fields was a snap, and we could choose from any of seven field types. Having structured the table, we were able to generate our records. Unfortunately, MapInfo makes you resort to pull-down menus each time you want to add a record to an open table.

Merging two tables was also a bit more difficult than in Atlas GIS. Atlas GIS leads you through the merge process; in MapInfo, we accomplished the task using the SQL Select utility by entering arguments. We first entered the names of the tables to be joined, then specified (with some trouble) the argument to tell MapInfo how to join the tables.

The one major advantage MapInfo has in this category is that its relational structure allows you to share data among tables. You can, for example, perform join operations on the fly to combine columns from different tables into new tables, or you can add columns from one table to another without having to copy the data.

MapInfo's relational structure does make up for some of its case-of-use problems. However, the program's inability to perform external SQL queries, along with the relative awkwardness of creating and working with tables, holds the program's score to good.

SPATIAL QUERIES:

MapInfo's radius search tool is almost identical to the one found in Atlas GIS. MapInfo also provides a rectangle select tool, and unlike Atlas GIS, the program offers a boundary search tool that selects all objects within any region you choose.

Unfortunately, MapInfo's approach to layers has one awkward result. When you select objects using the marquee or radius search tools, the program selects objects only in the uppermost layer that is marked as selectable.

We were surprised to find that there is no tool for selecting all objects adjacent to the currently selected object. (You must use the SQL utility for that.) At the same time, we were pleased to find that MapInfo's buffer tools have been significantly enhanced.

Building a simple buffer around an object is easy enough. The dialog box offers a field for specifying the radius of the buffer, as well as two controls that are new to this version. You can now specify whether the program should create individual buffers for the selected objects or a single buffer for all. Second, like Atlas GIS, MapInfo is now capable of adjusting buffer widths according to values from tables. Having created the buffer, it's easy to select objects within the buffer.

MapInfo 3.0 offers a couple of other powerful, new spatial analysis tools. The program's Target editing model allows you to use polygons on one layer as "cookie cutters" to combine and split regions on other layers. When you do so, you can split or combine the data attached to the regions as well. We used this feature to analyze the number of people within a specified radius of a store in our sample map. We found this new capability both powerful and welcome.

MapInfo makes it easier to make layers editable and to perform operations such as creating thematic displays.

MapInfo 3.0 also sports a nifty, new "redistricting" feature that allows you to combine selected regions on the fly and view the effects of the accumulating data. The utility (which is very useful for such chores as building sales territories) has two limitations, however. First, you can only combine regions that already exist in a layer. You're not, in other words, performing a radius search, buffer, or window operation. Second, the result of a redistricting operation is not new map territory, but rather a selection of regions, which you can later combine if you want to save it.

Although MapInfo's spatial analysis tools are somewhat more difficult to learn and employ than Atlas GIS', they are also more powerful. Each product offers a comparable set of buffering tools. Atlas GIS offers better tools for selecting adjacent and contained objects, but MapInfo raises its score with its redistricting feature. MapInfo earns a score of good in spatial queries.

GEOCODING:

On the plus side, MapInfo allows you to geocode not only addresses, but any other point data you wish to attach to any boundary. (Atlas GIS cannot do this.) On the minus side, MapInfo's geocoder isn't as easy to set up or as flexible as Atlas GIS'.

Atlas GIS allows you to specify as many as four address-matching methods to employ in separate passes; MapInfo prompts you to specify only a single column for the match information (usually street address), though you can also specify a "boundary," such as a ZIP code or town boundary, to eliminate the problem of duplicate streets.

This procedure is not as flexible as that employed by Atlas GIS; however, it has the potential for greater accuracy. A record in MapInfo has to exactly match the street address; in Atlas GIS, if you specify multiple matching methods, you will not be certain whether a specific record is being matched to an exact address or only to a ZIP code.

Unlike Atlas GIS, MapInfo doesn't allow you to relax match criteria. The result in our testing was that we had to interactively geocode more records using MapInfo; but if you use Atlas GIS' relaxation options, you face a greater chance of mistakes in geocoding.

In geocoding our small sample of 100 addresses, we found MapInfo to have accuracy rates and speeds comparable to those of Atlas GIS. MapInfo failed to find matches for 32 addresses in batch mode, compared to 24 for Atlas GIS.

It's important to note that MapInfo combines its address information with street files. That means that in order to geocode to one region, you must load that region's street maps, a requirement that means you can't practically geocode to more than one or two counties at a time due to limited disk space and memory. We rate MapInfo's geocoding good.

REPORTING:

MapInfo's reporting tools are strong and generally easy to use. Just open all the map and browser windows you're going to want to print on the page (including even statistical windows, tables, charts and legends), and then open a new Layout window, which offers a WYSIWYG display of the page. In this window, you can rearrange elements by simply dragging them around with your mouse, or you can select multiple objects and use alignment commands to arrange them, for example, with the same center line.

MapInfo's layout tools include a text tool for adding titles and captions, for which you can use any of your installed Windows fonts.

There is one limitation we'd like to see corrected: MapInfo gives you few options for customizing legends. Although you can select symbols' styles and change titles, you can't adjust the spacing of items or change the amount of white space between the legend items and the border. This is a minor quibble, however. On balance, MapInfo earns a score of very good in reporting.

AVAILABILITY OF MAPS AND DATA:

MapInfo contains several sample data files, including world boundaries and demographics (broken down only by country), and rather extensive U.S. data by state. The U.S. data offered includes population figures as well as other demographic, economic, and business data. The CD-ROM that comes with MapInfo contains additional world data files and selected ZIP code and other files for California and San Francisco.

The company offers nearly 100 data sets, including additional maps and demographic and lifestyle data. Examples is on boundary files, with extensive sets provided for the United States and Canada and less detailed sets for other regions of the world.

Demographic and business data is primarily limited to federal Census Tract Demographics and MapInfo's StatInfo series of products covering population, income, and retail and business profiles. The great majority of U.S. data sets have been updated since 1990, although the timeliness of Canadian and other foreign

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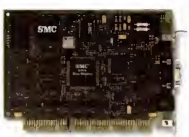

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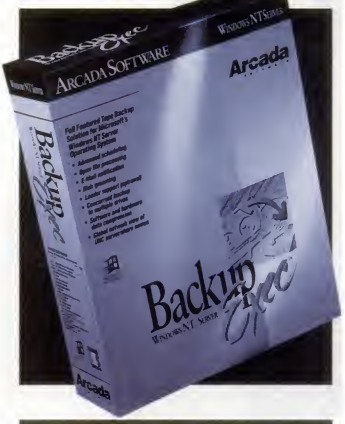

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MICROSOFT WINDOWS NT

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Windows NT Integration:

MIS Experts Seek Solutions To Add Windows NT To NetWare

RALEIGH, N.C. Microsoft's Windows NT platform has arrived, but the question in the minds of corporate MIS managers and value-added resellers is how will Windows NT mix with their current network installations? According to industry experts, current Windows NT adopters are taking a "wait-and-see" stance, and are seeking strategies to test the waters by adding Windows NT to their existing Novell NetWare and UNIX infrastructures.

According to a recent survey of 199 workstation sites conducted by International Data Corp., 58 percent indicated they would buy a Windows NT PC for uses other than as a workstation, and 40 percent said they would buy NT to add to workstations that are already installed. At the same time, a recent Forrester Research survey of Fortune 1000 companies revealed that Novell NetWare is installed in 88 percent of those companies surveyed, and is the dominant network operating system in 75 percent. The same Forrester survey showed that only 6 percent of companies surveyed currently have Windows NT installed, and that none of those surveyed have tapped NT as a dominant networking platform but are experimenting with Windows NT servers.

The message seems clear: Novell NetWare will continue to dominate as the most widespread network operating system while Windows NT will have to find its own role within the corporate enterprise.

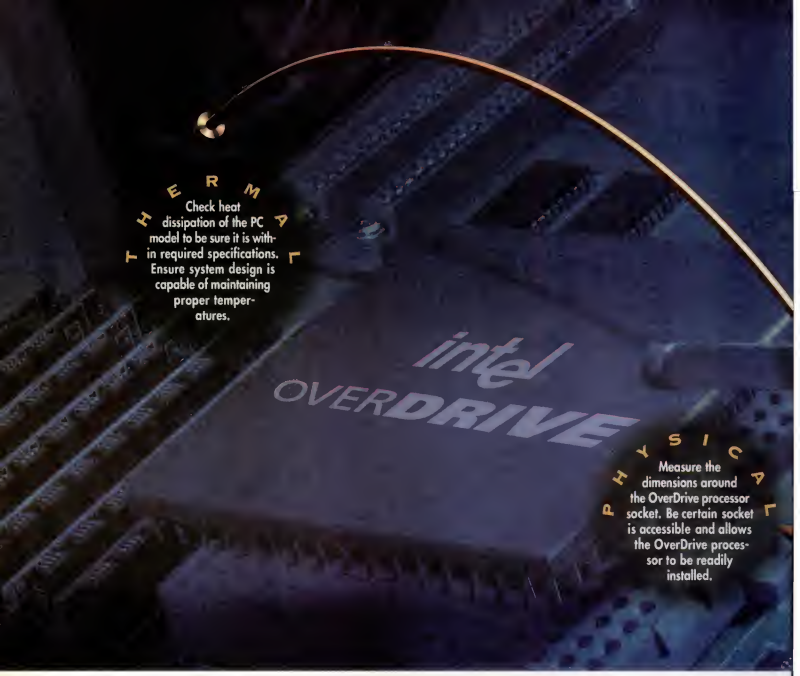
To help meet the needs of users who want to add Windows NT to their networks without disrupting their installed NetWare environment, Beame & Whiteside Software has developed BW-MultiConnect for Windows NT. BW-MultiConnect extends connectivity to NetWare by adding kernel-level IPX/SPX protocol support to Windows NT.

Unlike other approaches that require software for every NetWare client, BW-MultiConnect is loaded as a set of Windows NT drivers on the server so no additional software is required on the client side. As a result, NetWare users gain seamless access to Windows NT files and print services from their existing NetWare client workstations.

According to T.J. Fiske, a software engineer in the Computer Support Department at QUALCOMM, Inc. in San Diego, BW-MultiConnect for Windows NT is just what the doctor ordered for his NetWare environment. QUALCOMM has a diverse computer network which includes 14 NetWare servers interconnecting about 900 Macintosh workstations and 1,100 PCs, as well as miscellaneous UNIX and OS/2 systems. Since QUALCOMM develops electronic mail systems, satellite tracking, and related telecommunications solutions, the company uses its network for software development as well as office applications, so there are approximately 1.6 workstations per employee.

"We are highly committed to NetWare as a server base," Fiske said. "Just in the past year we have invested quite a bit in new Novell software. But we've added NT as a stable environment for developing new CAD and 32-bit software. Using software like BW-MultiConnect for Windows NT is definitely the right way to integrate Windows NT into our Netware environment. It doesn't force you to log into the server, but lets the NT server remain passively connected to the network so you can access it only when you need to."

For more information about BW-MultiConnect for Windows NT, call Beame & Whiteside Software at: (800) 463-6637.



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ATLAS / from page 127
Version 2.0

exports Tiger, AutoCAD .DXF, and ARC/Info files, and can import .DLG and Etak files. Atlas GIS even supports MapInfo's file formats.

We rate Atlas GIS very good in import and export.

SPEED:

Atlas GIS ran at the same speed as MapInfo in four of our six tests. It was faster at printing a map, requiring 37 seconds to MapInfo's 47 seconds. (This time was the only one that showed much difference.) On balance the products are equal in this category. We rate speed good.

DOCUMENTATION:

Atlas GIS' documentation was updated for Version 2.0. The hard-copy manuals that accompany the program are well-written, with clear explanations supplemented by ample illustrations. However, the indexing of the manuals needs some attention.

In addition to the reference manual, Atlas GIS is accompanied by an extensive tutorial manual that is very effective in familiarizing users with the program's features. Strategic Mapping also provides a short guide to getting started and a transition guide for users of the DOS version.

Atlas GIS' on-line help is generally thorough and well written, but it is not sufficiently indexed. The program could also do a better job of providing on-screen cues. There are, for example, no pop-up or status-line cues for toolbar or toolbox icons.

Atlas GIS' strong tutorial material earns the program a good score in documentation.

REPORT CARD — INFO WORLD

Mapping software

	(Weightings)	Atlas GIS for Windows Version 2.0		MapInfo for Windows Version 3.0	
List price*		**$495**		**$1,295**	
Installation and configuration	(25)	Good	(15.63)	Satisfactory	(12.50)
Map creation and modification	(100)	Good	(62.50)	Very Good	(75.00)
Data query and display	(100)	Good	(62.50)	Very Good	(75.00)
Advanced data operations	(50)	Very Good	(37.50)	Good	(31.25)
Spatial queries	(75)	Good	(46.88)	Good	(46.88)
Geocoding	(100)	Very Good	(75.00)	Good	(62.50)
Reporting	(75)	Good	(46.88)	Very Good	(56.25)
Availability of maps and data	(100)	Very Good	(75.00)	Good	(62.50)
Expandability	(50)	Very Good	(37.50)	Very Good	(37.50)
Import and export	(25)	Very Good	(18.75)	Satisfactory	(12.50)
Speed	(25)	Good	(15.63)	Good	(15.63)
Documentation	(50)	Good	(31.25)	Very Good	(37.50)
Support					
Support policies	(50)	Good	(31.25)	Good	(31.25)
Technical support	(75)	Very Good	(56.25)	Very Good	(56.25)
Value	(100)	Excellent	(100.00)	Good	(62.50)
Final score		**7.1**		**6.7**	

*Prices are for stand-alone packages. Atlas GIS costs $1,195 for three users or $3,495 for 10 users. MapInfo has no list prices for multiuser purchases; prices are negotiable.

GUIDE TO REPORT CARD SCORES

InfoWorld reviews only finished, production versions of products, never beta-test versions.

Products receive ratings ranging from unacceptable to excellent in various categories. Scores are derived by multiplying the weighting (in parenthesis) of each criterion by its rating, where:

Excellent = 1.0 - Outstanding in all areas.
Very Good = 0.75 - Meets all essential criteria and offers significant advantages.
Good = 0.625 - Meets essential criteria and includes some special features.
Satisfactory = 0.5 - Meets essential criteria.
Poor = 0.25 - Fails short in essential areas.
Unacceptable or N/A = 0.0 - Fails to meet minimum standards or lacks this feature.

Scores are summed, divided by 100, and rounded down to one decimal place to yield the final score out of a maximum possible score of 10 (plus bonus). Products rated within 0.2 points of one another differ little.

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MAPINFO / from page 128
Version 3.0

data is more variable. We rate the availability of maps and data good.

EXPANDABILITY:

MapInfo is available for Windows, Macintosh, and Sun and HP Unix systems. Data files generated on any platform are fully compatible with versions on other platforms. The program is available in 13 foreign languages.

MapInfo Corp. also provides a powerful programming language (MapBasic) for modifying MapInfo and creating custom applications.

More than 300 third-party products (including utilities and MapInfo-based applications) are available, ranging in price from less than $100 to several thousand dollars. We rate expandability very good.

IMPORT AND EXPORT:

MapInfo can open dBase, ASCII, Lotus 1-2-3, and Microsoft Excel files, as well as a range of raster image formats. When you open ASCII, Lotus 1-2-3, and Excel files, however, you'll find that you can't actually edit the tables. You can query the tables, but if you want to edit the information or add new columns you'll have to first save the tables to the MapInfo format.

You can import geographic files from AutoCAD or other MapInfo files. The Export utility lets you save graphics and tables in AutoCAD .DXF files, as well as to MapInfo .MIF format. Table data can be exported in dBase and ASCII.

MapInfo does not support public-domain geography file formats, such as Tiger, nor Atlas GIS' AGIS format. MapInfo does ship an optional $595 module that allows you to import ARC/Info files. We rate MapInfo's import and export satisfactory.

SPEED:

MapInfo and Atlas GIS were almost identical performers in our speed tests. MapInfo was slightly faster at combining data from two layers of a map into a third layer, taking 2 seconds vs. 4 seconds for Atlas GIS. On balance, the products are equal in this category. We rate speed good.

DOCUMENTATION:

MapInfo's documentation was fully updated for this version. The printed documentation is adequately illustrated, thoroughly indexed, and generally well written, although on more than one occasion we found the explanations of features to be a bit dense.

The reference manual offers explanations of all the commands and options that appear on the program's menu bars. The users' guide organizes the program's features under functions. There are sections on Querying, Selecting, Drawing and Editing, and so on. Each of these sections includes a useful minitutorial.

We found MapInfo's on-line help to be thorough and better indexed than Atlas GIS' help utility. MapInfo's icons are generally easier to understand, and MapInfo provides cues to tool functions in the status line when you click on them. We rate documentation very good.

SUPPORT:

Support policies: MapInfo offers a 60-day money-back guarantee. There are 90 days of free telephone support via an 800 number; support begins upon receipt of customer registration of the product. The support staff is available weekdays from 9 a.m. to 7 p.m. Eastern time. There's a fax-back service but no commercial on-line forums. An extensive selection of optional training and consulting services is available at extra cost. We rate MapInfo's support policies good.

Technical support: We never had to wait more than a minute to reach technical support, and on each of our calls we received immediate and accurate answers. We found the staff to be very knowledgeable about the product and eager to help. MapInfo's technical support earns a score of very good.

VALUE:

Most users who buy MapInfo will probably buy other data and map products as well, and many will purchase training and third-party applications. Thus, buyers have to look at the full range of support and available data and services when they are assessing the relative value of MapInfo.

With Atlas GIS' recent price drop, MapInfo ($1,295) costs $800 more, and if you need the SQL DataLink module for accessing external databases, you're going to have to spend another $595. (You must negotiate with MapInfo for multiuser pricing.)

MapInfo is the superior product for pure mapping functions. It has better tools for creating, editing, and manipulating maps. If these are your primary needs, you'll find it a worthwhile purchase in spite of its higher price tag. We rate its value good. ❑

VALUE:

As with MapInfo, most users who buy Atlas GIS are buying into a product line of maps, data, and services that goes far beyond the basic program.

Atlas GIS' new single-user list price of $495 (a figure less than one-third of its previous price) makes the product a bargain, particularly when you consider that it includes certain modules, such as SQL capabilities, that cost extra with MapInfo. Prices for networked installations are $1,195 for three users and $3,495 for 10 users. Atlas Script/VB costs $495; a version is also available for the C language.

In addition to having a lower price, Atlas GIS is the easier product to use, and the data available for this product is broader and more current than MapInfo's. We rate value excellent.

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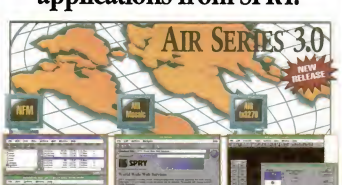

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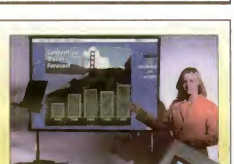

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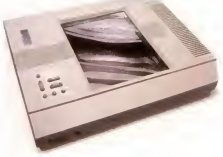

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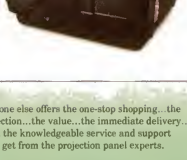

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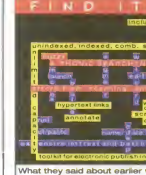

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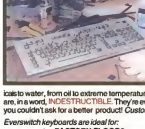

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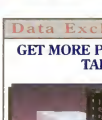

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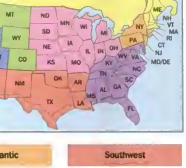

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UPCOMING IN INFOWORLD

SEPTEMBER 26

PRODUCT COMPARISON

Client/server data modelers. Data modelers can help you sketch out a blueprint for the client/server application you want to build. We evaluated how well Logic Works Inc.'s Erwin/ERC 1.5c for PowerBuilder, Popkin Software & Systems Inc.'s System Architect 3.0, and Asymetric Corp.'s InfoModeler 1.01 helped us create logical data models and physical database schemas.

ENTERPRISE

Feature: Ever since the original *Star Trek* allowed Capt. Kirk to meet with alien dignitaries on-screen, people have envisioned boldly holding business meetings without having to actually go to one another's locations. Desktop videoconferencing tools coming to the market now are making this dream an accessible reality — if you are willing to invest in some infrastructure.

OCTOBER 3

PRODUCT COMPARISON

Midrange project management. These days even modest undertakings can grow into tangles of time, money, and people. We compare four midpriced Windows project management software packages — Computer Associates International's CA-SuperProject 3.0, Microsoft's Project 4.0, Scitor's Project Scheduler 6, Version 1.5, and Symantec's Time Line 6.0 — that promise to help you stay on top of your work.

ENTERPRISE

Feature: For years businesses have pushed papers from department to department — getting approval on expense reports and memos. Software companies are now touting products that let you put all that on-line. We look at the workflow products, promises, and hangups.

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REVIEWS / TEST DRIVES

First Look / Kelly Conatser

Quattro Pro improves, but still trails leaders

Novell/WordPerfect's first edition of Quattro Pro 6.0 for Windows promises substantial improvement over Version 5, the uneven effort currently on the market. In the new Quattro Pro, rumored to be announced next week and released before year's end, the menus and toolbars both benefit from a complete redesign.

New features such as one-step hot-linking to external database tables and in-cell editing give Quattro Pro a unique edge in some areas and help it catch up in others. Best of all, some problem areas in Quattro Pro 5 have been addressed: The data modeling desktop, Quattro Pro's add-in answer to Microsoft Excel's pivot tables, is more stable (though no easier to use), and the Scenario Manager, which can destroy files without warning in Version 5, seems to have been tamed.

Quattro Pro 6.0 for Windows makes the most of several design concepts borrowed from Lotus 1-2-3 for Windows and WordPerfect. One example is the Paste Jar, for inserting an object. Toolbars (known as speedbars in the previous release) sport sharper, less cluttered icons, and Quattro Pro now displays only one of its standard toolbars at a time. (You can still use the toolbar control menu to append additional custom toolbars.)

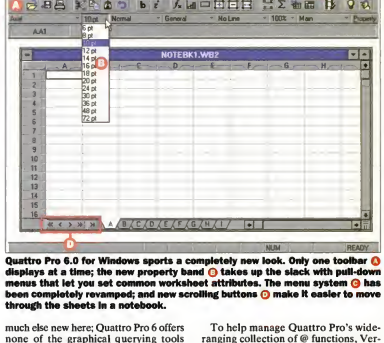
To compensate for the loss of several often-used icons that Version 5 displays in a second toolbar, Version 6 provides a slender "property band," which is akin to 1-2-3's SmartIcons and which appear in the other WordPerfect suite products. The property band resides above the worksheet and contains tiny pull-down menus that allow you to apply essential settings, such as font, alignment, cell underlining, and the zoom factor. The pull-down Style menu contains several common numeric formats and will expand to accommodate custom styles that you create. However, to apply some numeric formats, such as four fixed decimal places, you must still right-click and choose Block Properties from the shortcut menu.

DRAWING LAYER ON GRAPHS. Like 1-2-3 for Windows and Excel, Quattro Pro for Windows now offers a drawing layer that allows you to edit graphs (Excel and 1-2-3 call them charts) on the spreadsheet and place drawn objects there as well. The numeric graphs you create within the sheet are linked to a source graph on the notebook's Objects page; as in Version 5, you can display and edit this source graph in its own window. However, editing graphs in the drawing layer isn't as intuitive as it could be. For example, it isn't immediately obvious how to set numeric formats on an axis or turn off the graph gridlines that Quattro Pro displays by default. And to start the editing process, you must double-click the graph the way you do in Excel; it isn't enough to simply select it.

Other new graphing features include simple bullet charts that are linked to text entries in the worksheet, and the Graph Advisor, which suggests various styles for a graph, based on the parameters you specify. There's also drag-and-drop graphing, which partially mimics the Excel feature that automatically updates a floating chart after you drag data from the worksheet into the chart. There is a difference: Quattro Pro lets you drag only new data series into a graph; Excel lets you create new series or expand existing ones. For example, if you have a bar graph that displays annual revenues from 1990 to 1993, and you then drag 1994's label and revenue total into the graph, Quattro Pro gives you a new series, rather than extending the current series. You can also link text elements in numeric graphs (such as titles and axis labels) to worksheet cells, but this requires some cumbersome notation. For example, if you want a graph title to correspond to the label in cell C2 of the worksheet, you must enter the code \C2\ in the Graph Titles dialog box.

Improvements in other areas are mixed. Quattro Pro widens its lead in spreadsheet presentation technology with enhancements, including master slides and presentation advisors, to its impressive slide show utility, but developer tools in the user-interface builder are still intermittently frustrating. You can align, resize, and connect custom controls with ease, but the simple task of placing a multiline text object on a dialog box is still maddeningly difficult. The Scenario Manager now consists of a dialog box instead of a toolbar, the way it does in 1-2-3 and Excel. Quattro Pro also supports OLE 2.0 as a client and a server, providing cross-application drag-and-drop and edit-in-place capabilities.

FAST DATABASE LINKS. In the database arena, the new Tools Table Link command and the corresponding @TABLELINK function represent the fastest way yet to create live spreadsheet links to an external database table. Complex external queries are still handled by the Database Desktop add-in; you can save a query in a QBE file, which you can then use directly from Quattro Pro to repeat the query. Unfortunately, there isn't much else new here; Quattro Pro 6 offers none of the graphical querying tools found in 1-2-3 for Windows and Excel. You must still rely on on-sheet criteria ranges for even the simplest queries, and tools for querying an external database table are rigid and difficult to use.



Quattro Pro 6.0 for Windows sports a completely new look. Only one toolbar (A) displays at a time; the new property band (B) takes up the slack with pull-down menus that let you set common worksheet attributes. The menu system (C) has been completely revamped; and new scrolling buttons (D) make it easier to move through the sheets in a notebook.

Quattro Pro for Windows' workgroup tools use a publish-and-subscribe metaphor. You publish one or more pages of a notebook to individuals you specify from an address book that you create. You can later publish a revision to your original publication, and individual subscribers have the option to use or ignore the revised versions. One of the most appealing aspects of this scheme is the way that Quattro Pro's Workgroup Desktop automatically manages the data transfer: You can publish information to users on any of several messaging systems, including Microsoft Mail, cc:Mail, Notes, MCI Mail, and various standard LANs, simply by selecting the user names from an address book. (If you have no E-mail system, you will have to expend some effort to create an address book.)

HEY, COACH! Quattro Pro 6 offers several new on-line tutorial tools, but they are generally designed for beginners. In the new release, software imitates life as Version 5's experts, represented by a professorial figure in cap and gown, take a back seat to "coaches," whose icon appears in all toolbars. (The coach is represented by a yellow-faced hunchback with a crooked grin, perhaps as revenge for some programmer's long-ago humiliation in gym class.) In keeping with this image, coaches are sometimes too bombastic. It takes eight panels, for example, for a coach to teach you how to delete a column.

Based on the preferences you specify (A), the Graph Advisor suggests different formats for a graph (B). To apply a suggested format to a graph, you click it in the scroll list on the right side of the dialog box.

To help manage Quattro Pro's wide-ranging collection of @ functions, Version 6 offers the new Formula Composer utility. Though not listed as a coach or an expert, the Formula Composer works very much like Excel's Function Wizard and exceeds it in some ways. You use the first dialog box to pick an @ function from a category list; in the second, you fill in the @ function arguments. The Formula Composer tops the Function Wizard by offering a fairly detailed description of the @ function, often complete with example. Although it's helpful to have this information at your fingertips, this ambitious design of the Formula Composer is slightly flawed because the explanatory text hogs so much of the dialog box that there is room to display only three arguments at a time. When no @ function is selected, this space is occupied by a graphical calculator that lets you create arithmetic formulas without ever touching the keyboard.

WELCOME RELIEF. In general, the new Quattro Pro for Windows should provide welcome relief for those who are currently struggling with Version 5. The sweeping revisions to Version 6's user interface and the implementation of catch-up features such as in-cell editing make the product considerably easier to use. Other major improvements — for example, the addition of a drawing layer that lets you edit graphs and graphical objects within a worksheet — will put Quattro Pro users in the catbird seat when it comes to presenting spreadsheet data. However, changes in some key areas, most notably database management, stop well short of the complete overhaul that would be required to vault Quattro Pro for Windows ahead of its competition.

WordPerfect, the Novell Applications Group, in Orem, Utah, can be reached at (800) 451-5151 or (801) 225-5000; fax: (801) 222-5077. ❑

Kelly Conatser is the author of several books on spreadsheets, and consults on spreadsheets and databases. He lives in Kenner, La.

First Look / Rob Ward

Visual C++: All dressed up and nowhere to go

I love the compiler wars; they provide the sort of competition that drives vendors to create products such as Microsoft Corp.'s Visual C++ 2.0.

Microsoft has upgraded much of the compiler's features, tossed in some innovation here and there — and done nearly all of it right. Although new, this version hasn't lost the basic elements of previous editions.

I've been using Version 2.0 for the past two weeks to create a multithreaded Windows NT application, and I'm impressed. If anyone has won the compiler wars, it's developers.

Of course, there is some irony in the timing of Visual C++'s appearance. After all, it's a 32-bit-only development package produced by a company well into its third attempt at producing a 32-bit operating system popular enough to make people want to write applications for it. With Windows 95 (aka Chicago), Microsoft seems to have put Descartes before the horse: Windows 95 will exist, therefore Microsoft thinks you need this compiler. So, unless NT suddenly becomes trendy, Visual C++ sales may be slow in the near term.

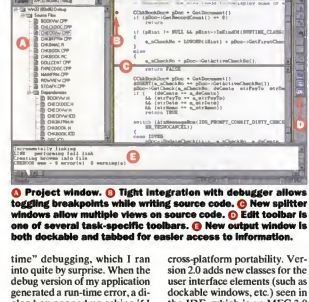
A Users can dock toolbars for greater flexibility in arranging the workspace. B Individual resource editors are now fully integrated in the IDE. C Users can dock or float individual parts of tool palettes.

AN IDE WHOSE TIME HAS COME. The design team brought in expert help for the integrated development environment (IDE), and it shows. Project management, for instance, has evolved from the truly wretched to the truly useful. Both the debug and retail versions of source files are listed in separate branches of a hierarchical tree, which also shows dependencies.

You can easily set compiler and target options for the whole project or for individual files by selecting them with the right mouse button, a capability long overdue. The best part is that you can edit any type of file (whether it's a source code file or a resource, such as a bit map or an icon) just by double-clicking the file name. The appropriate editor will open the file and run in its own child window within the IDE.

The IDE's usability is further spiffed-up by new interface items such as dockable windows, dockable and tear-off toolbars, and tabbed dialogs, making it the most easily configurable IDE I've seen. And, in a surprising break with long tradition, Microsoft has included a usable text editor with column blocking, keyboard macros, and a lot of nifty customizable options.

The IDE is now impressively integrated with the system and employs a feature called "just-in-time" debugging, which I ran into quite by surprise. When the debug version of my application generated a run-time error, a dialog box popped up asking if I wanted to debug it. When I pressed OK, the debugger took me right to the offending line of code. All it didn't do was fix the bug for me.



A Project window. B Tight integration with debugger allows toggling breakpoints while writing source code. C New splitter windows allow multiple views on source code. D Edit toolbar is one of several task-specific toolbars. E New output window is both dockable and tabbed for easier access to information.

The full-featured integrated debugger has replaced Codeview and has the expected displays: registers, memory, local variables, and disassembly. You can follow individual threads, debug DLLs and OLE clients and servers, and step through the call stack in both directions, watching local variables update as you go.

A STRONG FOUNDATION. The cornerstone of Visual C++ is MFC, the Microsoft Foundation Class Library. MFC provides friendlier access to the various APIs and a method of achieving cross-platform portability. Version 2.0 adds new classes for the user interface elements (such as dockable windows, etc.) seen in the IDE, which is an MFC 3.0 application itself. MFC also has new database, OLE, and template-based container classes.

C/C++ code is never as portable as advertised, but MFC does go a long way in allowing a single code base to target Chicago, NT, and Win32s. I had an unexpected glimpse of the future (or perhaps just a glimpse of Microsoft dreaming) upon opening one of the many sample projects that ships with Visual C++. From the project window, I clicked the right mouse on one of the source files and selected "Targets..." from the menu to see the list of supported platforms — and got a list box full. There were debug and release versions, as well as ANSI and Unicode versions of Intel, MIPS, and Macintosh — 10 target versions in all.

When I created my own application, I only got one choice: Win32. Time will tell if that tantalizing list of targets will ever be implemented.

BUILT FOR SPEED. Visual C++ 2.0's compiler, Version 9.0, has new C++ optimizations, as well as optimizations for the Pentium and 80486 processors. An option lets you blend optimizations for both processors where possible. An incremental linker, also new with this release, can cut down build times by relinking only changed object files. (Unfortunately, this can fatten the executable, so use the full linker for the release version).

This version of the compiler conforms much more closely than its predecessor to the emerging ANSI standards, most notably in its implementation of templates (parameterized types) and structured exception handling. Better still, the MFC library has new classes based on these important but still underutilized capabilities of the language.

Visual C++ will be shipping within 30 days after Windows NT 3.5, which is expected out in two to three weeks. The package includes the 32-bit development system, Version 1.51 of Visual C++, the OLE Control Kit, and extra utilities. Microsoft estimates the street price will be $399. For $499, you get three more CDs over the course of a year containing whatever upgrades appear in the interim. Upgrade discounts are available for current users.

Microsoft, in Redmond, Wash., can be reached at (206) 882-8080. ❑

Rob Ward is Senior Test Developer in Reviews & Testing.

WINDOWS TEXT DATABASE

askSam upgrade boasts better authoring tools

BY PATRICK MARSHALL
CONTRIBUTING EDITOR

When we first looked at askSam Systems' askSam for Windows about a year ago, we found the text database program to be a very promising first release. But we also found significant and surprising gaps in askSam's feature set.

Version 2.0 of askSam, which should be shipping by the time you read this, fills many of those gaps.

The enhancements in Version 2.0 go a long way toward making askSam not just the "information manager" it purports to be, but also a competitor in the emerging category of electronic document publishers. Among the most notable improvements are askSam's stronger search tools and its new spelling checker.

Although the previous version of askSam only let you search a single file at a time, this update lets you search multiple files simultaneously once you import data into askSam. You can even search for empty fields in records. The spelling checker lets you check a highlighted selection or an entire document, or you can set it to check spellings as you type.

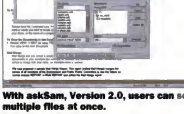
The program also sports more than a dozen lesser, but very welcome, enhancements, including more flexible controls over text formatting. Version 2.0 now offers a wider variety of import filters, including ASCII (plain, comma-separated, tab-delimited, and fixed position), CompuServe Information Manager, dBase, RTF, Word for Windows, and WordPerfect; askSam Systems also sells a filter pack with 14 other import filters. The program now supports automatic field recognition after importing files, making it easier to bring in structured text files.

If you want to build electronic documents, askSam's hypertext links and bookmarks will make the job easier. askSam Systems sells an optical character recognition (OCR) module for scanning documents into your databases.

Finally, askSam for Windows is available in a network version, making it a viable choice for those who want to share documents among a group of users.

For the first 90 days after askSam for Windows ships, the stand-alone version will sell for $149.95. After that, it will cost $395. The OCR add-on sells for $99.

askSam Systems, in Perry, Fla., is at (800) 800-1997 or (904) 584-6590; fax (904) 584-7481; BBS: (904) 584-8287.



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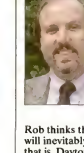

Down to the Wire / Nicholas Petreley

Following our noses through a Daytona beta installation

Senior test developer Rob Ward, who is skeptical about the future of IBM and OS/2, contributed to this column.

Rob thinks the entire computing world will inevitably be governed from DC — that is, Daytona and Chicago. He's more convinced than Microsoft, it seems. Last he heard, Microsoft is picking Windows 3.1 as the least common denominator for its single code base for Word and Excel. That means the 32-bit versions of Word and Excel won't multithread, even though they will be compiled for operating systems that support multithreading.

That's just what we need more of — Windows 3.1 usability on advanced operating systems. The image that comes to mind is a calculator with a slide rule interface, though we confess that image better suits Windows NT with the look and feel of Windows 3.1.

Anyway, the plan is to get Rob to look at the second beta of OS/2 3.0 soon, to see if the more attractive desktop and new features change his mind. For example, the new OS/2, code-named Warp, has an installation program that sniffs out your display board and disk controller card and then automatically configures the operating system to completely ignore them.

All right, so the current installation sniffer suffers from olfactory fatigue. We still managed to get Warp installed on four machines in spite of the help the installation program insisted on giving us.

SCRATCH AND SNIFF. Let's just see what happens when we put the nasal passages of our latest beta copy of Daytona to the test. Our target machine has a 3Com 3C509 network card and an Adaptec SCSI card. These are pretty popular cards, so the setup shouldn't be that difficult to identify.

We prepare the boot manager to let us install Daytona on a vacant partition. We run the installation up to the point where the machine needs to reboot. It's off to a good start. The newly redesigned logo beats the pants off the hokey OS/2 opening logo. Yes, we know the OS/2 circles now blink while OS/2 is loading, creating a somewhat animated effect. But, in our opinion, it still wins Dr. Tongue's two-dimensional house of wax booby prize for lame logos.

Back to the Daytona installation. Now we see a series of obscure and meaningless (at least to us) error messages. Then we wind up with two options. We can ignore the error messages, which means Daytona may crash. Or we can exit, in which case we'll have to do the installation all over again and probably end up in exactly the same place. Or we can take a third option not offered by the installation program, and that is to give up on the project entirely and go get a couple of room-temperature amber ales.

The last option being clearly the most productive, we choose instead to ignore the error messages. Now we get more obscure and possibly meaningless error messages. Then we are taken through a merry series of reboots, during which it is not possible to select IBM PC DOS from the boot manager. That's probably because the boot manager now refers to that partition as an unrecognized operating system on the C: drive. And, given the choice between an unbootable but recognized version of NT and a bootable but unrecognized version of DOS, the boot manager automatically chooses the former, NT, every time.

After about four trips through this series of events, we begin to prepare some mug shots in the hope that the boot manager will somehow recognize IBM PC DOS. Then suddenly, we get it to boot PC DOS, though we're not sure how. Either it pooped out and paused long enough for us to make the right selection, or we happened to hit a key in the Rob of time. It would have been in the Nick of time, but Rob is the one banging on the keyboard. The unrecognized operating system on the C: drive comes up fine, even if it's not sure what it is.

SNIFF AND SNUFF. So, given few other choices, we begin to reinstall Daytona. This time we get warned that the network card parameters are not verifiably correct. This is, of course, opposed to the more intuitive contrapositive, "verifiably incorrect," which would actually give us information we could use.

Now, it may be that there is something wrong with the card. But it's not likely. We just ran the 3C509 configuration utility to be sure the card was set up properly. And we know it works fine under what we have previously established as the non-multithreading uncooperative multitasking Windows 3.1.

So we really have no other choice than to tell Daytona to do its best and finish up. Not surprisingly, when the installation is done, we can't see the network.

So we shut down Daytona and reboot PC DOS. We run Windows just to make sure the 3C509 hasn't had an internal hemorrhage during the installation, rendering it unusable. Oddly enough, we think this may be the case, because we are not able see the network from Windows anymore.

We rerun the 3C509 configuration utility to see what we can see. Well, what do you know? The Daytona installation program must have recognized the 3C509 after all, because it cleverly reconfigured the card to use the external transceiver instead of the twisted-pair connector. And, while it was at it, it changed the base memory address setting.

Now, some people might see this as malicious vandalism, but we're far more forgiving. No harm done, because it's a one-time install fiasco. We reconfigure the card and run Windows once more to verify that the card still works. It does. We reboot Daytona. It reconfigures the card again.

It looks as if the only way we'll get anything useful out of Daytona is if we change the network card or find some way to get Daytona to stop sticking its nose in the 3C509's business.

You are, however, welcome to stick your proboscis in our business by sending us E-mail via the Internet at nicholas_petreley@infoworld.com, MCI Mail 527-1353, or CompuServe 71333,426.

NETWORK DIAGNOSTIC DEVICE

LANMeter serves as an effective troubleshooter

BY LAURA WONNACOTT
TEST DEVELOPER

Large, complex, and rapidly changing LANs are prone to network problems. Thus, network diagnostic tools have become an essential component of many IS departments.

I plugged Fluke Corp.'s 675 LANMeter into one of the Test Center LANs to assist me in characterizing and troubleshooting network congestion in our latest benchmark development. I also lent the LANMeter to our IS department for use on our production network.

In addition, I took the battery-powered, 4.5-pound LANMeter into the field for some real-world troubleshooting on a problematic LAN.

I found the LANMeter extremely easy to use, especially compared with more complex protocol analyzers. LANMeter offers many benefits of a combined protocol analyzer and simple cable scanner.

The interface is simple, and the backlit display makes viewing the small (4.75-by-2.5-inch) screen easy. Within seconds, the LANMeter characterized network traffic across each LAN segment that was running our LAN benchmark. The LANMeter quickly analyzed and reported network utilization rates, including the impact of collisions on network performance.

Context-sensitive help is just a button away and provides guidelines and hints for interpreting network statistics. The LANMeter reports such useful information as the distribution of traffic by protocol and a list of the top sending and receiving stations on the network.

The LANMeter breaks down error statistics by type, including jabbers, short frames, and local or remote collisions. It supports many popular protocols, including NetWare's IPX, TCP/IP, Banyan Vines, Digital's Phase IV and DEC LAT, AppleTalk, and many more. LANMeter also has auto-test options for hubs and network interface cards. These options include a host of tests to ensure correct network hardware operations.

LANMeter includes a suite of tests designed for NetWare networks. It assists in identifying misconfigured routers, for example, with routing analysis, which displays a real-time graphical breakdown of local and remote traffic on each LAN segment.

The portable LANMeter weighs 4.5 pounds and has a battery life of about 3 hours.

Other NetWare-specific tests include a servers list, which is similar to NetWare's Display Servers command. We discovered one shortcoming in the file statistics for NetWare.

The LANMeter failed to correctly break down file vs. print traffic on the network. This option will not work correctly with newer versions of NetWare, according to Fluke.

I took the LANMeter into the trenches to see how quickly it could diagnose problems on a 10Base-2 (thin coaxial wire) Ethernet network. The LANMeter gave quick and accurate diagnoses. Within seconds, the LANMeter identified a faulty terminator and quickly isolated shorted cables.

The LANMeter also estimated the total length of the network at 475 feet, well within Ethernet cable limits. The LANMeter provides support for both shielded and unshielded twisted-pair and thin coaxial cables.

Before returning to the Test Center, I captured and printed network diagnostic information for the local LAN administrator using the LANMeter's data logging, capturing, and printing options.

The 675 LANMeter we used supports both Token Ring and Ethernet networks and lists for $9,795 (including backlit display). The 670 LANMeter, with MAU and NIC connectors, monitors Token Ring LANs; the 672 LANMeter, with HUB, NIC, and BCN connectors, offers the same features on Ethernet LANs. Each has a list price of $6,495.

Fluke, located in Everett, Wash., can be reached at (800) 44-FLUKE or (206) 347-6100; fax: (206) 356-5116; Internet: lans@fluke.com.

"Microsoft Access 2.0 does an excellent job of bridging the gap between end user and programmer, providing easy-to-use tools without sacrificing power and flexibility." – PC Week *2/28/94*

"The new version [of Microsoft Access] makes it easier to share information between programs, and includes new features for every level of user." – PC World *6/94*

"Microsoft Access 2.0 for Windows [is] coming closer than any other database product ... to achieving a mix of features, power and ease that's well-suited to novices, developers and everyone in between." – PC Magazine *6/14/94*

MICROSOFT ACCESS. IT KEEPS PICKING UP MOMENTUM.

With all the critical acclaim that's coming down, it's no wonder Microsoft Access' relational database management system 2.0 is building such a big following. Among everyone from database beginners to high-end developers to the reviewers.

PC Magazine found it had extraordinary power and ease-of-use. From setting up a database to creating forms and reports to developing applications. They said its "polished technology and user-friendly wizardry are a major step ahead." And they gave Microsoft Access 2.0 their Editors' Choice award in both the end-user and developer database categories.

Windows Sources added their take, "[Microsoft] Access 2.0 offers significant enhancements for all levels of users ... who want an all-purpose Windows"-based DBMS."

So come and see for yourself what Microsoft Access 2.0 is all about. And discover why news this good has a way of snowballing.

Microsoft Office

Leaner, less expensive Notes Express won't support existing Lotus Notes applications

BY DOUG VAN KIRK

ATLANTA — Lotus Development Corp. last week announced and shipped Notes Express, a stripped-down version of the Notes client that focuses on messaging activities and has a $99 price tag.

But Lotus failed to deliver the capability to run existing Notes applications, which many analysts and users had expected in Express.

"We don't see the need for a run-time [version] at this point," said Cliff Conneighton, director of marketing for Lotus' Communications Products Marketing Group. He stressed that Express would run applications built with third-party development tools, such as PowerBuilder and Visual Basic. "[Express] can load any server database," he explained, "but it won't give you [access to] folders, forms, or views."

These are key elements that full Notes clients can create.

But NetWorld+Interop attendees here last week weren't sure what to make of Express, especially in light of previous announcements about a cc:Mail front end to Notes.

"They're telling me they're going to offer this capability in cc:Mail," said an IS manager from New Jersey with several hundred cc:Mail users. "But then they say I should buy Express now."

The lack of full run-time capabilities is a serious omission, said Heidi Dix, a software analyst at Forrester Research, in Cambridge, Mass., who speculated that Lotus left out that functionality in the interest of selling full-priced versions of Notes. "We're basically think they're just being greedy," she said.

But others disagreed.

"Express offers the conferencing and E-mail functionality many users want at a good price," said another analyst familiar with the product.

Notes Express includes incorporates Notes Mail and four other mail-based productivity applications: a discussion database, a corporate phone book, a reference database, and news feeds.

Lotus will offer a $60 competitive upgrade from Microsoft Corp. Mail and Novell Inc. GroupWise.

CONTURA / from page 1

400s replace aging Compaq line

usage, Compaq said.

Following the lead of competitors such as Apple Computer Inc., AST Research Inc., and Dell Computer Corp., Compaq is now centering the notebooks' trackball below the space bar.

Other features in the new Contura include an attachable handle and a keyboard with a 4-degree tilt.

Preinstalled software includes DOS 6.2, Windows 3.1, and Lotus Organizer.

Compaq is also offering two docking stations, one with a $179 port replicator and the other with built-in Ethernet and port replication for $299.

Analysts said Compaq needs the new notebook systems to stay in step with well-designed portables from IBM, Toshiba, AST, and Dell.

"Compaq was No. 1 last year, but they've had some problems this year on portable lines with their trackball, PCMCIA slots and the Concerto line," said Randy Giusto, an analyst at BIS Strategic Decisions, in Norwell, Mass.

This summer Compaq recalled several models of its LTE Elite notebooks because of problems with the PCMCIA slot, and replaced the trackball on its 4/66 notebook with an improved system.

— Terho Uimonen is the Taipei, Taiwan, correspondent for IDG News Service.

COMPAQ / from page 1

Rocks corporate world with AMD chip

announcement last week of a bevy of new AMD-based Compaq Presario models.

But whereas the Presario line is targeted exclusively at the consumer market, ProLineas are shipped to technically-savvy and fastidious corporate customers.

The current price for the ProLinea MT 4/66 system is $1,599, which includes a 340MB hard drive and 4MB of RAM.

Corporate users appear ready for the systems. "Compaq will stand behind the product and there aren't too many other vendors who will. It doesn't matter whose chip it is out there on the system, as long as [Compaq has] done the testing," said a user aware of ProLinea's AMD processor development.

"IS managers really have to trust their vendor and if they do, they shouldn't have to worry about which chip is running their system," said Chuck Taylor, manager of client/server computing at Resolution Trust Corp., in Washington.

"This is consistent with plans that they had stated earlier. They're still a big customer. Maybe we've lost an order but we haven't lost a customer," said an Intel spokesman.

Preliminary tests conducted by *InfoWorld's* Test Center, found the AMD and Intel systems to be practically identical, with Intel systems showing a slightly higher BAPCo SYSmark/Win93 rating of 124.58 vs. 124.26 for AMD. Compaq says these differences in performance are happenstance.

The Compaq system tested came with 16MB of memory and 4MB allocated to SmartDrive. There was no external cache on the system, which was run at a resolution of 800 by 600 with 256 colors.

NETWARE / from page 1

Novell provides a peek beyond 4.1

more seamless support of devices, a relational database version of the directory, and client and server support for Novell's AT&T NetWare Connect on-line service. The upgrade will also integrate IPX and Internet Protocol into a single NetWare version.

The upgrade will also include a more robust Visual App-Builder that will support application partitioning. This feature will be provided via a distributed version of the AppWare bus and enhancements to scripting language to enable corporate users to better distribute applications over multiple clients and servers.

"Visual AppBuilder today lets you distribute applications on the client," said Richard King, executive vice president of the NetWare Systems Group, "but when you get into high-performance applications like [on-line transaction processing], many large users would like to focus more of their application processing on the server."

Also in 1995, NetWare will extend the performance of its network administration directory — NDS — and provide support for E-mail and telephony and address book applications, officials said. For the on-line services, Novell plans to invigorate its directory services technologies to better handle the hundreds of thousands of nodes expected to be using the AT&T NetWare Connect online service.

The long-awaited IP/IPX integration will allow the growing number of large NetWare users to standardize on the popular IP and still obtain seamless access to the full suite of NetWare services, including file, print, directory, security, messaging, and management, Novell officials said last week.

"NetWare IP doesn't provide as tight integration [with NetWare services] as we have in mind for this next major upgrade," King said. The installation will be a one-step process, simply asking the administrator whether he wants the server to run under IPX or IP. An advanced NetWare client will also come with the product, providing each NetWare node with optimal IP or IPX support.

SPRINT/ from page 1

New look for videoconferencing

point videoconferencing capabilities for PCs, Macintoshes, and Unix workstations that run over existing corporate Ethernet and Token Ring LANs and frame relay WANs. In the future, Invision may put videoconferencing over the Internet.

AT&T, IBM, PictureTel Corp. and PictureTel Corp. now offer point-to-point conferencing, but none of them offers full multipoint connections at a reasonable price. All have committed to delivering the connections in 1995 but none has detailed price, ship dates, or hardware/ WAN links that users might need.

By year's end, InVision will ship a full multipoint version, InVision 4.0, offering 20 frames per second of live motion videoconferencing to an unlimited number of PC, Mac, or Unix users.

"With IP multicast, unlimited number of people can receive live video and audio feeds," said James Geddes, president of InVision, in Vienna, Va. With multipoint , "InVision users will have the freedom to open multiple windows on their PC and receive multiple IP data streams."

A point-to-multipoint version for one-way broadcasts will ship Oct. 14 as InVision 3.1.

InVision, priced at $595, will meet standards for videoconferencing (H320 and H261) and compression (JPEG and MPEG), said James Geddes, InVision president and CEO. InVision will break the point-to-point barrier by moving its software and offloading crucial throughput operations to traditional hardware routers, starting with those from Wellfleet Communications Inc.

InVision's approach will add Internet Protocol (IP) multicasting and NQSS streaming protocol software from Syzygy Communications Inc. to its existing point-to-point package for LANs and WANs.

Analysts like InVision's two-step approach. "They can do multipoint connections and use technology that adds multicasting. If the router vendors support multicasting, it will work over a WAN; and that is a really important piece," said Paul Callahan of Forrester Research, in Cambridge, Mass.

Wellfleet and Cisco will be first to supply NQSS in its routers, and InVision is conferring with other router vendors, Geddes said. For Wellfleet, NQSS — which is based on the ST-II streaming protocol, a new standard backed by the Internet Engineering Task Force, an IP standards body — helps solve the problems of bandwidth reservation and quality of service over packet-based networks, said Mick Scully, vice president of product management at Wellfleet. "You don't need a $50,000 [compression/decompression system] to do that. You can use your existing network along with Wellfleet routers," he said.

"Our interest was piqued when we saw InVision's ability to leverage our existing hardware and software," said Gary Cooper, MIS director at Tyson Foods, who has a frame relay network to rapidly move data among 20 sites across the United States and is currently beta testing Invision 3.1 "InVision does that and for a relatively small investment."

For its part, Sprint this week will ship a multipoint desktop conferencing system for Unix workstations called Communique, from InSoft Inc. of Mechanicsburg, Pa. Communique is available for $1,750 per user for Hewlett-Packard Co.'s Apollo 9000 workstations, Sun Microsystems, Inc.'s Sparcstations, and Digital Equipment Corp.'s Alpha AXP workstations running OSF/1.

Collaborative software costs $695 extra. A full package with audio and video boards, camera, and microphone starts at $3,500. The PC package will ship in January.

Keith Wimberley, InSoft's marketing director, said Communique supports multipoint conferencing in its software and can use most any type of switched or dedicated WAN data services.

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Distributed Thinking / Stewart Alsop

Will Novell be responsive to Frankenberg's discipline?

Will the new Novell thrive and prosper? New CEO Bob Frankenberg has rolled out his grand strategy for reviving the company and giving it a strategic direction. The strategy's elements are: 1. Combine NetWare and UnixWare into a single system (although the products will still be sold separately); 2. Introduce a new universal client that does the network better than any desktop operating system; 3. Turn NetWare Lite into NEST (NetWare Embedded Systems Technology), a component that gives set-top boxes and other run-time environments network functions; 4. Build a public network of services by working with infrastructure companies such as the telephone system; 5. Finish integrating and networking the WordPerfect applications suite; and 6. Keep the Main Street consumer applications started by WordPerfect.

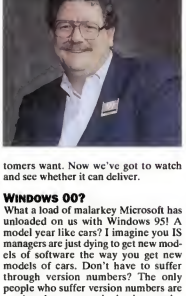
There's actually not very much news here. What's new is that Frankenberg is trying to instill a sense of discipline in Novell, a company without much. It will be interesting to watch and see just how responsive Novell employees will be. The company has gotten out of Novell DOS, AppWare Foundation, Btrieve, and FlexCIS and is working on VMS as a platform anymore, but none of those things was making money or a difference anyway. For Novell, discipline has to mean making much tougher decisions about the GroupWise and UnixWare efforts, ones that will require the company to say no in advance, not well after an effort has failed.

The crucial initiative, the one that rules the vast majority of the revenues of the company, is what's called SuperNOS. The company has still really not made a choice between selling NetWare and UnixWare. Instead it has chosen to try to combine the two into a single operating system. This is very difficult, because they are radically different systems. Frankenberg believes the company can do it. He says Novell will begin by delivering a symmetric multiprocessing capability that can work with either operating system by the end of this year and then work toward a completely merged system in 1996. But it is difficult to name another vendor who has successfully merged two operating systems: maybe IBM twice, first with System 360 and then again with OS/400. Who else?

Even if the company does successfully merge the two systems, it is not clear that NetWare customers or UnixWare customers will be happy with the result. Note that NetWare 3.x customers have been relatively slow to upgrade to 4.x, not because it was buggy or didn't do what it was supposed to, but because it was different. And being different in information systems is scary stuff.

The other important initiative is the WordPerfect applications. As time goes by, WordPerfect is getting more and more respect for the work it has done both with its desktop applications and with WordPerfect Office, the server component of which is now referred to as GroupWise. All of the other initiatives are new and may produce significant revenue in the future. They may even be strategic, but won't matter if the company can't deliver on its network operating systems and applications.

The sense I have is that Novell has taken the first steps: eliminating dumb projects, beginning to deal with underlying problems, and promising what customers want. Now we've got to watch and see whether it can deliver.



WINDOWS 00?

What a load of malarkey Microsoft has unloaded on us with Windows 95! A model year like cars? I imagine you IS managers are just dying to get new models of software the way you get new models of cars. Don't have to suffer through version numbers? The only people who suffer version numbers are vendors, because versioning is a precise way of communicating to customers exactly what they are getting, and vendors hate to have to admit exactly what they have done. (I remember Roger Heinen, now at Microsoft, explaining to me at Apple why System 7 would never have a period after it because it was a product name and not a version number. Now Roger's gone from Apple and we have System 7.5.)

Microsoft doesn't want to call this version Windows 4.0 for various reasons. The company will take a lot of grief from IS managers who want to wait for 4.1 and remember that it took 18 months to get from 3.0 to 3.1. Most customers are smart enough to figure out that Microsoft should have called the last version 4.0 and this one 5.0, and will wonder why the company can't figure out what to call the product. The company wants to switch naming systems so it can manage what third-party software developers do more easily. (In fact, I think Microsoft is jealous of Intel's successful switch in naming systems, when it introduced Pentium to replace the x86 names.)

So here's the killer question to ask your Microsoft representative: Since it is taking an average of 2.5 years to get new versions of Windows to the market, what is Microsoft going to call the version that gets to market in the year 2000? Windows 00?

MEA CULPA

Every once in a while, I make a really stupid mistake that is especially difficult to admit to (as opposed to the regular old mistakes I make all the time). Two weeks ago (see "Will IBM really announce a pointless PowerPC product?", Sept. 5, page 98), I said that Windows NT was the platform for the delayed baggage-handling system at the new Denver airport and implied that was the reason for the delay. Actually, OS/2 is the platform for the system, and it looks as though the application was poorly specified and then suffered from a lack of management controls.

Editor in chief Stewart Alsop welcomes comments and may be reached on the Internet at stewart_alsop@infoworld.com.

Notes From the Field / Max Terwillicker, Son o' Cringely

Without any signs of waffling, Lotus decides against DOS Organizer PIM

I had a dream about President Clinton the other night. He was chatting with Hillary about the guy who crash-landed a stolen plane into the White House. He was brooding in classic Clinton style.

"I'd like to have a press conference in the Oval Office and say that this horrible man was a deranged fanatic who would have been charged with treason. A modern-day Benedict Arnold! But then, what would the liberals think? I wasn't being sensitive to the mentally challenged folks out there."

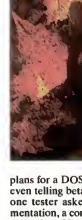
Hillary nodded, a small scowl starting to form.

"Instead, I could say that he was a hero to hard-working Americans in the heartland who have marveled at the feats of role models like Evel Knievel. But that might upset the upper crust. Maybe..."

"You couldn't decide what to do in Bosnia, Haiti, and Cuba, and now this, in our own backyard. Is there anything you *can* decide on?"

"I love fried pickles."

DOS DISORGANIZED. And users of the Lotus Organizer PIM for DOS are in a pickle now. Lotus has quietly dropped plans for a DOS version of the app, not even telling beta testers about it. When one tester asked for additional documentation, a confused tech support person said, "Uh, that's been dropped." Lotus' official claim is that none of their customers wanted it. But that doesn't excuse them from not breathing a word of their plans to anyone, including some very interested beta testers.



If it's hard to find an excuse for the leaded-footed response time of Intel's NetportExpress XL print server. The box comes plastered with comments trumpeting its new AppleTalk support. But after one user set it up, he found that it takes 15 minutes to print one page of text on an HP LaserJet 4M.

When he called Intel, the company admitted that the current version of software in this product drops seven out of eight AppleTalk network packets — which are then retransmitted, so the effect is exponential. Six weeks ago, the fix was "two weeks away"; now the fix is due in early October. In the meantime, though, there isn't even any beta code for the fix to tide over the most disgruntled user.

BIX NIXED. Being decisive is one of Clinton's weakest points, methinks. Waffling has become more than a habit; he's made it into an art form. First he waved a pen saying he'd veto any health care bill without universal coverage, then he said he'd consider less than 100 percent coverage, and next he'll say, "I waved that pen around to try to get the ink down."

Another sleight of hand is going on at Borland, where support help through the Borland forum on Bix seems to have magically disappeared. One user who posted a question for Borland through Bix has been waiting more than a month for an answer. Answers are apparently still to be had on Borland's CompuServe forum, but at a steeper charge than the Bix users have been paying. Borland denies dropping Bix support, but they could at least take a look at those questions one of these months...

CRIMEBILLGATE. And then there's the vaunted crime bill, which Clinton just signed into law last week. While its provisions include more police officers, prisons, and other goodies, it also makes it "illegal to intentionally transmit a program, data, code, or commands to another computer system that would damage the receiving system or interrupt its usage." This applies to the intentional transmission of the program, not to the purpose of the code. The implications are mind-boggling. For instance, it might mean Windows 95 would put Bill Gates behind bars!

My dad, Bob Cringely, is not in jail, cannot pass go, and cannot collect his $200, until he gets back from vacation. Keep sending tips to me by calling (415) 312-0555; fax: (415) 358-1269; or cringe@infoworld.com.

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IBM PS/2 Server 95 Array
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